



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 7**

11201 Renner Boulevard  
Lenexa, Kansas 66219

**DEC 26 2019**

Mr. Ed Galbraith  
Director, Division of Environment Quality  
Missouri Department of Natural Resources  
Jefferson City, Missouri 65102

Dear Mr. Galbraith:

Under Section 303(c) of the Clean Water Act, 33 U.S.C. § 1313(c) and Title 40, parts 131.20 and 131.21 of the Code of Federal Regulations, states must review their Water Quality Standards at least every three years and submit any new or revised WQS to the U.S. Environmental Protection Agency for review and approval or disapproval. As Director of Region 7 EPA Water Division, I am charged with the responsibility of reviewing and approving or disapproving new and revised WQS under Section 303(c).

On April 16, 2018, the EPA received the submittal of new and revised water quality standards under a cover letter dated April 13, 2018. The new and revised WQS were formally adopted by the Missouri Department of Natural Resources on January 4, 2018, were published in the Missouri Register on October 16, 2017, and became effective under state law on April 30, 2018. The WQS submittal package included a certification letter from the Office of the State Attorney General dated March 27, 2018. The MDNR also provided further clarification on elements of the Multiple Discharge Variance Framework in their letter to the EPA dated August 16, 2019. On December 14, 2018, the EPA acted on the nutrient criteria provisions in the submission. On July 30, 2019, the EPA acted on several other portions in the submission, including certain definitions, the Missouri Use Designation Database, certain specific criteria, paragraphs A and C of the variance authorizing provision, and the chronic cadmium criteria.

Today, the EPA is approving the following provisions: 1) new and revised WQS included in the Missouri Code of State regulations, 10 CSR 20-7.031(12)(B), WQS portions of the "Missouri Multiple Discharger Variance Framework from the Water Quality Standards of Total Ammonia Nitrogen, CWC-MDV-1-17" and associated Multiple Discharger Variance(s); 2) New and Revised Aquatic Life Criteria for 30 Pollutant Parameters; and 3) 10 CSR 20-7.031(1)(EE) Revised Waters of the State definition.

**WQS on which the EPA is Continuing Review**

- 10 CSR 20-7.031(5)(E): Revised pH Definition
- Table J: [New 'place-holder' for "Water Quality Standards Variances"]
- Two errors (Table I which was inadvertently truncated during the last rulemaking, and aquatic life protection values for 2,4-dichlorophenol and hexachlorocyclopentadiene that were accidentally omitted from the final version of Table A1) which the State plans to remedy in rulemaking effort currently in progress.

The enclosure to this letter provides a more detailed description of the EPA's rationale for approving the new or revised WQS. We look forward to continuing to work with the MDNR to update its WQS through the triennial review process. If you have any questions regarding this matter, please contact me at (913) 551-7146.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeffery Robichaud". The signature is fluid and cursive, with a large loop at the end.

Jeffery Robichaud  
Director  
Water Division

Enclosure

cc: Chris Wieberg, MDNR  
John Hoke, MDNR  
Karen Herrington, USFWS  
Corey Buffo, EPA HQ

## **ENCLOSURE**

### **EPA REGION 7 ACTION ON THE MISSOURI 2018 WATER QUALITY STANDARDS REVISIONS**

Under Section 303(c) of the Clean Water Act (CWA), 33 U.S.C. § 1313(c) and Title 40, Part 131.5 of the Code of Federal Regulations, states must review their WQS at least every three years and submit any new or revised WQS to the EPA for review and approval or disapproval. This review involves a determination of whether:

- The state has adopted designated uses consistent with the requirements of the CWA;
- The state has adopted criteria that protect the designated water uses;
- Whether the state has adopted an antidegradation policy that is consistent with 40 C.F.R. § 131.12, and whether any State adopted antidegradation implementation methods are consistent with § 131.12;
- Whether any state adopted WQS variance is consistent with 40 C.F.R. § 131.14;
- Whether any state adopted provision authorizing the use of schedules of compliance for water quality-based effluent limits in NPDES permits is consistent with 40 C.F.R. § 131.15;
- The state has followed its legal procedures for revising or adopting standards;
- The state standards that do not include the uses specified in Section 101(a)(2) of the CWA are based upon appropriate technical and scientific data and analyses;
- Whether the state submission meets the requirements included in 40 C.F.R. § 131.6 of this part and, for Great Lakes States or Great Lakes Tribes (as defined in 40 C.F.R. § 132.2) to conform to Section 118 of the CWA, the requirements of 40 C.F.R. Part 132; and
- The state submission meets the requirements included in 40 C.F.R. § 131.6.

The EPA's review of Missouri's 2018 WQS submittal as described in this enclosure includes:

- Approval of: A) new and revised WQS included in the Missouri Code of State regulations, 10 CSR 20-7.031(12)(B) and WQS portions of the "Missouri Multiple Discharger Variance Framework from the Water Quality Standards of Total Ammonia Nitrogen, CWC-MDV-1-17" as well as Multiple Discharger Variance(s); B) New and Revised Aquatic Life Criteria for 30 Pollutant Parameters; and C) 10 CSR 20-7.031(1)(EE) Revised Waters of the State definition.
- The EPA has determined that several appendices submitted as supporting documentation are not new or revised WQS; and therefore, are not subject to an EPA action.

As part of the review process, the MDNR made the final draft WQS and supporting documentation available for public review and comment in the Missouri Register on October 16, 2017, which marked the beginning of the public comment period that ended on November 28, 2017. The Missouri Clean Water Commission held a public hearing on November 21, 2017 to receive public input. The Office of the State Attorney General certified the final WQS on March 27, 2018, and the final WQS regulations were published in the Missouri Register on March 31, 2018, becoming state law. Based on our review, Missouri's public participation process is

consistent with, and satisfies, the procedural requirements of 40 C.F.R. § 131.20, and submission of certification by the Office of the State Attorney General meets the minimum requirement of 40 C.F.R. § 131.6(e). In addition, the MDNR public noticed a list of potentially applicable stream segments that could be covered under the Missouri multi-discharger variance for total ammonia nitrogen from July 1, 2019, through August 9, 2019 (see attachment 1).

## **EPA APPROVAL**

### **A. Missouri's Water Quality Standards Variance Authorizing Provisions**

#### **1. EPA Approval of 10 CSR 20-7.031(12)(B) Water Quality Standards Variance Authorizing Provision New Paragraph B and “Missouri Multiple Discharger Variance Framework from the Water Quality Standards of Total Ammonia Nitrogen, CWC-MDV-1-17” (incorporated by reference)<sup>1</sup>**

Under section 303(c) of the CWA, a WQS variance requires both a public hearing and the prior approval of the EPA. To obtain approval, a state must show that the designated use and criterion is not feasible throughout the term of the variance because of one of the factors listed 40 C.F.R. § 131.14(b)(2)(i)(A). A variance provides a state additional time to implement adaptive management approaches for improving water quality while retaining the designated use and criterion as a long-term goal. EPA has recognized that WQS variances can apply to individual dischargers, groups of dischargers, and entire water bodies or segments thereof.<sup>2</sup> The EPA can approve a variance for a specific discharger or group of dischargers where the state satisfies the requirements in 40 C.F.R. § 131.14.

Collectively, the variance authorizing provisions provided in 10 CSR 20-7.031(12) portions of the *Missouri Multiple Discharger Variance Framework from the Water Quality Standards of Total Ammonia Nitrogen*, as approved, enables the state to develop less stringent water quality based effluent limitations in situations where a WQS cannot be achieved in the short-term owing to at least one of the factors at 40 C.F.R. § 131.14((b)(2)(i)(A). Variances granted under 10 CSR 20-7.031(12) and approved by the EPA may be applied by the state in the issuance of water quality certifications under CWA Section 401 and in the implementation of WQBELs and CWA Section 402. The state is reminded that variances approved by the EPA do not replace designated uses and associated water quality criteria, nor do they provide a basis for delisting impaired waters under Section 303(d) of the CWA. 40 C.F.R. §131.14(a)(2), (3). The EPA looks forward to working closely with the MDNR in the implementation of the state's new variance authorizing provisions.

The EPA has reviewed the following new and revised WQS and determined that they are consistent with the CWA requirements. 40 C.F.R. § 131.13, provides that variance policies may be adopted at state discretion, and that such general policies are subject to review and approval

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<sup>1</sup> In the EPA's July 31, 2019, approval of several provisions in Missouri's submission, the EPA indicated it was continuing to review some provisions, including new paragraph B, in the water quality variance authorizing provision. The EPA approved paragraphs 10 CSR 20-7.031(12)(A) and (C) on July 31, 2019.

<sup>2</sup> 80 Fed. Reg. 51020, 51036 (Aug. 21, 2015).

by the EPA. The following provides the basis for EPA approval of Missouri's general authorizing provision for variances.

Missouri New Paragraph B:

**(B) Individual variances may be granted using the terms, conditions, and procedures found in the “Missouri Multiple Discharger Variance Framework from the Water Quality Standards of Total Ammonia Nitrogen, CWC-MDV-1-17,” finalized by the department on September 15, 2017, which is incorporated by reference and does not include any later amendments or additions. The department shall maintain a copy of the referenced documents and shall make them available to the public for inspection and copying at no more than the actual cost of reproduction.**

The MDNR establishes in Paragraph B, and as incorporated by reference, “*Missouri Multiple Discharger Variance Framework from the Water Quality Standards of Total Ammonia Nitrogen, CWC-MDV-1-17*,” that “[e]ach variance shall be issued and evaluated using methods outlined in the *Framework*. And each multiple discharger variance for total ammonia nitrogen is applicable only to minor well-functioning, multi-celled, facultative lagoon systems where residents of a community would experience a substantial and widespread social and economic impact if required to upgrade their current lagoon system to meet the water quality standards for total ammonia nitrogen.

The new provisions included within Paragraph B and the *Framework* (see Attachment 2), as outlined below, are consistent with Sections 303(c) of the CWA, 40 C.F.R. § 131.14, and with 40 C.F.R. § 131.10(g), and are hereby approved by the EPA.

Scope

Scope is clearly described in the numbered Paragraphs 1-7 on pages 1-2 of the *Framework*. The language contained in these sections is consistent with 40 C.F.R. § 131.14 and is hereby approved as an authorizing provision. The EPA finds providing for specific eligibility criteria as an alternative to identifying the specific discharger to be consistent with the EPA's Preamble to its 2015 promulgation of 40 C.F.R. § 131.14. 80 FR 51019.<sup>3</sup>

EPA, however, approves the Paragraph 7, Factor Precluding Attainment, Substantial Impact Analysis, Step 1, Step 2, and Step 3 except the language as follows, in which EPA is reserving action to allow MDNR to clarify in its next rulemaking<sup>4</sup>:

“If the impact is determined to be “unclear”, the applicant is still eligible for a variance

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<sup>3</sup> The EPA's preamble to its final rule at 80 FR 51036 explains that “As an alternative to identifying the specific dischargers at the time of adoption of a WQS variance for multiple dischargers, states and authorized tribes may adopt specific eligibility requirements in the WQS variance. This will make clear what characteristics a discharger must have in order to be subject to the WQS variance for multiple dischargers. It is the EPA's expectation that states and authorized tribes that choose to identify the dischargers in this manner will subsequently make a list of the facilities covered by the WQS variance publicly available (e.g., posted on the state or authorized tribal website.).

<sup>4</sup> The language is not copied into this letter due to its length and inclusion of applicable Figures.

from the water quality standards of total ammonia nitrogen, and their financial capability will be reviewed during the next permit renewal cycle.”

#### Submission Requirements

Submission requirements are found in Appendix C (entitled MDV Application Process) on pages 19-20 of the *Framework*. The language found in Appendix C of the *Framework* is consistent with 40 C.F.R. § 131.14 and is hereby approved as an authorizing provision.

#### Term

The Term associated with the MDV is found in Paragraph 11 of the *Framework*. This language is consistent with 40 C.F.R. § 131.14 and is hereby approved as an authorizing provision.

#### Interim Requirements

Interim requirements are found in Paragraphs 8 and 9 of the *Framework*. This language is consistent with 40 C.F.R. § 131.14 and is hereby approved as an authorizing provision. The EPA also approves the additional Highest Attainable Demonstration for a Wastewater Lagoon and Pollution Minimization Plan language on pages 12-14, as an authorizing provision consistent with 40 C.F.R. § 131.14.

#### Reevaluation (and more stringent statement)

Re-evaluation is described in Paragraph 12 of the *Framework*. This language clarifies that the purpose of the reevaluation is to ensure that the highest attainable condition is maintained throughout the term of the variance. Where a more stringent condition is determined to be attainable, the *Framework* specifies that the more stringent condition must become the applicable HAC. The language also provides a list of changes that the state will evaluate to determine if they can be implemented by the permittee without causing substantial and widespread economic and social impact (i.e. “capacity to financially implement”). Where the MDNR determines that the discharger has the capacity to financially implement any of these changes (or additional changes), the MDNR’s language is clear that incorporation of these changes will be made in the permit. Therefore, this language is consistent with 40 C.F.R. § 131.14, and is hereby approved as an authorizing provision.

#### Threatened or Endangered Species

Threatened or Endangered Species are discussed in Paragraph 13 of the *Framework*. This language is consistent with the CWA and is hereby approved as an authorizing provision.

## **2. EPA Approval of Multiple-Discharger Wastewater Lagoon Ammonia Variances**

A variance is a temporary modification to the designated use and associated water quality criteria that would otherwise apply. It is based on a demonstration and targets achievement of the highest attainable use and associated criteria during the variance period. Modifying the use through a variance process allows the state to limit the applicability of a specific criterion and to identify an alternative designated use and associated criteria (or surrogate effluent condition) to be met during the term of the variance. The variance may be written to address a specified geographical coverage, a specified pollutant or pollutants, and/or a specified pollutant source. All other

applicable WQS not specifically modified by the variance remain applicable (e.g., any other criteria adopted to protect the designated use). A typical variance modifies the use and specified criteria as it pertains to the discharge of a single pollutant from a single source for a defined timeframe.

MDNR public noticed a list of potentially applicable stream segments that could be covered under the Missouri multi-discharger variance for total ammonia nitrogen (see Attachment 1).

Consistent with 40 C.F.R. §131.14(b)(1)(i), the MDV identifies the pollutants, potential waterbodies, and potential permittees subject to the WQS variance.

For each of the permittees, MDNR will include in its Water Quality Standards Table J, ammonia as the pollutant, the receiving waterbodies, and name and permit number of the permittees subject to the MDV. EPA will review and act on the Table J as a new or revised WQS as part of triennial reviews.

#### Summary of Qualifying Conditions of Missouri's Multiple Discharger Variance

Missouri's MDV from the WQS of total ammonia nitrogen applies only to minor well-functioning, multi-cell facultative lagoon municipal wastewater permittees that meet specific criteria as articulated in the conditions set forth in the *Framework*. The EPA approves the MDVs for minor municipal permittees **only** where 40 C.F.R. § 131.14 and all the following conditions of the *Framework* are met<sup>5</sup>:

- 1) The variance is of the total ammonia nitrogen criteria found at 10 CSR 20-7.031(5)(B)7 and Tables B1, B2, and B3, of the Water Quality Standards;
- 2) Qualifying dischargers include well-functioning, multi-celled, facultative, minor municipal Publicly Owned Treatment Works (POTW) lagoon systems that meet the requirements below and have received an engineering evaluation completed by a MDNR engineer. The requirements of well-functioning lagoon systems are found in Appendix A of the "*Missouri Multiple Discharger Variance Framework from the Water Quality Standards of Total Ammonia Nitrogen, CWC-MDV-1-17*". The template of the Field Engineer Evaluation can be found in Appendix B.

A well-functioning lagoon system must:

- Be designed to have no more than 25 percent loss of its design detention time as guidance suggest in the 10 States Standards<sup>6</sup>;
- Meet equivalent to secondary treatment technology based effluent limits for conventional pollutants;

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<sup>5</sup> Only MDVs that meet the requirements of the *Framework* and are consistent with 40 C.F.R. § 131.14, are effective for CWA purposes.

<sup>6</sup> Great Lakes - Upper Mississippi River Board of State and Provincial Public Health and Environmental Mangers, Recommended Standards for Wastewater Facilities, Policies for the Design, Review, and Approval of Plans and Specifications for Wastewater Collection and Treatment Facilities, 2014 Edition.  
<http://10statesstandards.com/wastewaterstandards.pdf>

- Not show signs of going septic or currently be septic;
  - Not show signs of significant scum or solids floating on the surface;
  - Not emit foul odors; and
  - Show no objectionable weeds, in or around the lagoon pond.
- 3) The discharger is located on one of the potentially applicable stream segments public noticed on July 1, 2019 through August 9, 2019 and found in Attachment 1, of this enclosure document;
  - 4) The MDV term will be up to 20 years from the date the EPA approves the provisions at 10 CSR 20-7.031(12)(B), and the variance for individual permittees is reevaluated every five years against the requirements set forth in the *Framework*;
  - 5) The municipality has met the requirements demonstrating the need for a WQS variance pursuant to CWA Section 101(a)(2) and the factor listed in 40 C.F.R. § 131.10(g)(6), that controls more stringent than those required by Sections 301(b) and 306 of the CWA would result in substantial and widespread economic and social impact;
  - 6) Implementation of this MDV will not result in any lowering of existing water quality. Pursuant 40 CFR§131.14, each facility is required to implement the pollution minimization plan (PMP) as specified in Appendix A, as well as the highest attainable effluent conditions (HAC). The PMP as defined in 40 CFR§131.3(p) is a set of enforceable activities to improve processes and pollutant controls that will prevent and reduce pollutant loadings. The PMP is a requirement through the term of the variance for all MDV recipients.
  - 7) The Highest Attainable Condition for total ammonia nitrogen for the facility which is reflective of the requirements set forth in the *Framework*, and the applicable HAC is either the initial HAC or a recalculated HAC as described in the requirements, whichever is more stringent.

#### Demonstration of Need

A WQS variance for a use specified in Section 101(a)(2) of the CWA requires a demonstration that attaining the designated use is not feasible during the term of the WQS variance due to at least one of the factors specified in 40 CFR § 131.14(b)(2)(i)(A).

The *Framework* and accompanying appendices detail three economic analyses to be used in evaluation. These analyses must determine that residents of an applicant system would experience substantial and widespread social and economic impact if required to upgrade their current lagoon system to meet the WQS for total ammonia nitrogen. The three economic analyses are the Cost Analysis for Compliance (CAFCOM) that is written by the MDNR, the alternatives analysis, and the Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities (WESI).



The EPA has reviewed and approved portions of the *Framework* to be used to conduct the economic analyses. In the EPA's letter dated May 16, 2019, the EPA explained the need for written clarification and assurance that the MDNR will not permit the variance based solely on the WESI being "unclear." The MDNR provided additional clarification on the process of economic evaluation in their letter to EPA dated August 16, 2019 (see Attachment 3). The MDNR explained that the MDV includes the Cost Analysis for Compliance (CAFCom) calculation for each municipality. This indicator will provide additional economic justification supporting whether the impact of treatment upgrades is "likely to be substantial." The MDNR confirmed that the variance will not be granted unless this factor is demonstrated. During the next rulemaking, the MDNR will further outline this clarification in the *Framework*.

#### Justification of Term

Per 40 C.F.R. § 131.14(b)(2)(ii), supporting documentation must demonstrate that the term of the WQS variance is only as long as necessary to achieve the Highest Attainable Condition. Such documentation must justify the term by describing the pollutant control activities that will be implemented during the WQS variance to achieve the HAC, including those activities identified through a Pollutant Minimization Program (PMP).

The MDV specifies that the resulting HAC is a quantifiable expression per 40 C.F.R. § 131.14(b)(1)(ii)(A)(3), and the "interim effluent condition that reflects the greatest pollutant reduction achievable with the pollutant control technologies installed at the time the State adopts the WQS variance, and the adoption and implementation of a Pollutant Minimization Program."

#### Highest Attainable Effluent Condition

Section 8 of the *Framework*, outlines two scenarios the MDNR determined to establish the seasonal highest attainable effluent condition. The MDNR will use the facility's site specific current and past five years of performance data of their well-functioning lagoon system.

Under Scenario 1, the MDNR will determine the final effluent limit in the form of the monthly average as the 95<sup>th</sup> percentile of reported concentrations for total ammonia nitrogen. The MDNR will determine the final effluent limit in the form of the daily maximum as the 99<sup>th</sup> percentile.

Scenario 2 addresses the situation when an applicant is meeting the total ammonia nitrogen criteria during one season, but not the other. For the season in which the facility can treat to the criteria level, the current criteria for total ammonia nitrogen will remain as the water quality based effluent limit. For the season in which the facility cannot meet the current criteria, the MDNR will issue the permit with the highest attainable effluent limits as the monthly average and the daily maximum, based on the 95<sup>th</sup> and 99<sup>th</sup> percentile, respectively, of the facility's current performance.

## Pollution Minimization Program

Section 9 of the *Framework* outlines the requirements of the PMP. During the term of the variance, each municipality that is issued a permit incorporating the terms and conditions of the MDV is obligated to meet all requirements of the PMP. The requirements of the PMP are as follows:

- a. The facility shall meet the standard of a well-functioning lagoon system;
- b. A certified operator must be maintained;
- c. The facility shall be well maintained;
- d. The facility shall meet equivalent to secondary treatment requirements;
- e. The facility must meet the highest attainable effluent conditions reflected as final effluent limits within their permit;
- f. The permit holder shall not accept new industrial waste containing significant ammonia concentrations as influent to the facility;
- g. The lagoon must be designed to have no more than 25 percent loss of its design detention time as guidance recommends in the 10 States Standards
- h. The permit holder shall measure sludge depth and report the depth to the Department during the variance application process and with each subsequent permit renewal application;
- i. The permit holder shall actively engage with the Department when compliance assistance is needed;
- j. The permit holder is to report any improved processes and controls that have been or will be implemented to prevent and reduce pollutant loadings using the PMP Annual Report Form;
- k. The permit holder must provide the Department with adequate financial documentation during the application process and permit renewals so that the Department can make an informed decision on whether or not the community would endure a substantial and widespread social and economic impact as a result of meeting the WQS of total ammonia nitrogen; and
- l. The permit holder must provide the Department with assurance that no threatened or endangered species and/or their habitats are adversely affected as a result of this variance.

In the EPA's letter dated May 16, 2019, EPA requested an additional explanation as to how the MDNR will manage permittees who receive the MDV but later lose detention time beyond the threshold defined for well-functioning lagoons. The MDNR explained in their letter dated August 16, 2019 (see Attachment 3), that the MDV outlines that a well-functioning lagoon is to have no more than 25 percent loss of design detention time. The PMP requires that permittees measure sludge depth and report it at each 5-year permit renewal. The MDNR clarified that if a lagoon appears to have rising sludge depth that will increase detention loss over 25 percent, the MDNR will establish a permit schedule for sludge removal as soon as possible.

The MDV identifies that the variance shall remain in effect for up to 20 years from the date of the EPA's approval. The MDV will be implemented during the permit renewal process;

therefore, not every permit issued under the MDV will receive the variance for a total time of 20-years. The MDNR finds that a 20-year variance is the appropriate time necessary to ensure each permittee in need receives adequate technical, managerial, and financial training, guidance, and assistance to support the municipality's future growth and sustainability. The EPA agrees with the MDNR's determination that the timeframe of the MDV provides necessary time to achieve the HAC, as well as meaningful reductions in ammonia through full implementation of the pollutant control activities identified in the PMP.

The EPA has reviewed the two scenarios for determining the highest attainable effluent condition and the list of activities under the PMP. The EPA considers such activities as appropriate justification for the maximum allowable time for the term of the variance.

### Reevaluation

Reevaluations must occur no less frequently than every five years after the EPA approval of the WQS variance. If a reevaluation does not occur within the frequency specified in the variance or if the results of such reevaluation are not submitted to the EPA within 30 days of completion, then the variance will no longer be the applicable WQS for CWA purposes. Section 12 of the *Framework* states this requirement. Section 12 also explains that a reevaluation will be completed on the MDV, including an evaluation of all approved ammonia control technologies, as well as an evaluation on the effectiveness of the PMP to ensure that degradation of water quality has not occurred during the term of the variance. As stated, if the reevaluation of the MDV "indicates that a feasible option exists for permit holders that would allow for compliance with the water quality standards for total ammonia nitrogen, the permits will be modified and issued with a schedule of compliance to meet WQBEL based on the underlying water quality standards for total ammonia nitrogen."

As outlined under Section 12, the Department will also conduct a reevaluation of the MDV for each permit holder, which will consist of evaluating the permit holder's financial capability, highest attainable effluent conditions, and a review of their PMP reports. Any necessary adjustments to the HAC and PMP will be made during the permit renewal process. If improvements to the financial capability of the permit holder occur during the term that would enable compliance with the WQS, the variance will be removed from the permit and the permit holder will be provided with a schedule of compliance to meet WQBEL for the WQS for total ammonia nitrogen.

The variance for each individual permittee must include language as to when the reevaluation will occur, and the opportunity for public input per 40 C.F.R. § 131.14(b)(1)(v). If any facility does not meet the conditions of the MDV, they are accordingly ineligible for a variance under the terms of the MDV. As noted above, if during the reevaluation required by 40 C.F.R. § 131.14(b)(1)(v), a facility no longer meets the requirements set forth in the MDV then that facility is no longer eligible for a variance under the EPA's approval of the MDV from total ammonia nitrogen.

The EPA notes the commitment by the MDNR to consider newly-identified affordable technology during the term of this variance, as well as a more stringent HAC and additional PMP

activities, if identified by the reevaluation process. The EPA recognizes that the term submitted with the MDV represents maximum allowable time. A reevaluation may result in a determination that a variance is no longer necessary.

#### WQS Update Table J

Additionally, Missouri will incorporate each MDV into Table J within 10 CSR 20-7.031. For each recipient of the MDV, Table J will include, at a minimum, the following: the municipality name, facility name, Missouri State Operating Permit number, receiving stream name, first classified waterbody identification (WBID) number, 8-digit hydrologic unit code (HUC-8), discharge location in Universal Transvers Mercator (UTM) coordinates, permit effective date, numeric highest attainable effluent conditions, and variance expiration date.

#### The EPA's Findings

The MDV is consistent with Section 303(c) of the CWA, and 40 CFR Part 131, including § 131.14, and is hereby approved by the EPA. This approval is subject to the demonstration that specific eligible permittees satisfy all the requirements of the MDV and that the assessment of eligibility and interim requirements is performed consistent with the conditions and procedures of the MDV. These requirements must be met before any MDV based effluent limitations can be included in the respective NPDES permits in lieu of a water quality based effluent limitation (WQBEL) based on Missouri's unvaried numeric criteria for total ammonia nitrogen.

#### **B. MDNR's Water Quality Standards Aquatic Life Criteria Submission**

In the April 13, 2018, revisions to the WQS, Missouri adopted new and revised aquatic life criteria values for 30 pollutant parameters. In revising its regulations at 10 CSR 20-7.031 Tables A1 and A2, Missouri adopted criteria for 29 pollutant parameters as stringent as those published by the EPA pursuant to Section 304(a) of the CWA for the protection of aquatic life. For the remaining pollutant, phenol, Missouri adopted aquatic life criteria consistent with the EPA's September 29, 2013<sup>7</sup> partial disapproval of phenol criteria. In its partial disapproval, the EPA provided an updated evaluation of the EPA's 1980 phenol guidance values for Missouri's warm, cool and cold water uses.

The science supporting the EPA's 304(a) recommended criteria, and the EPA's updated evaluation of the phenol criteria, support the EPA's conclusion that Missouri's criteria will be protective of aquatic life. As such, Missouri's revisions are consistent with 40 CFR §§ 131.6(b), (c), and 131.11 (a) and (b)(i), and the EPA hereby approves these new and revised criteria. The following table contains the **bolded** approved criteria values in 10 CSR 20-7.031 Tables A1 and A2 to represent the new/revised criteria; *italicized bracketed* criteria values represent deletions to Table 1A.

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<sup>7</sup> See: <https://dnr.mo.gov/env/wpp/wqstandards/docs/mo-phenol-decision-092713.pdf>

### Approved Aquatic Life Criteria

<b>POLLUTANT</b>	<b>CAS #</b>	<b>Acute</b>	<b>Chronic</b>
Arsenic	7440382	<b>340</b>	<b>[20] 150</b>
Chromium (III)	16065831	Table A2	<b>Table A2</b> $= e^{(0.8190 \cdot \ln(\text{Hardness}) + 0.6848)} \cdot 0.860$
Chromium (VI)	18540299	<b>[15] 16</b>	<b>[10] 11</b>
Mercury	7439976	<b>[2.4]</b> <b>1.4</b>	<b>[0.5] 0.77</b>
Methylmercury	22967926	<b>1.4</b>	<b>0.77</b>
Nickel	7440020	Table A2	<b>Table A2</b> $= e^{(0.8460 \cdot \ln(\text{Hardness}) + 0.0584)} \cdot 0.997$
<b>Alkalinity (minimum CaCO<sub>3</sub>)</b>			<b>20,000</b>
Chlorine, Total Residual (Warmwater Aquatic Habitat)	7782505	19	<b>[10] 11</b>
Cyanide	57125	22	<b>[5] 5.2</b>
Polychlorinated Biphenyls (PCBs)			<b>0.014</b>
Tributyltin (TBT)		<b>0.46</b>	<b>0.072</b>
<b>Nonylphenol</b>	<b>84852153</b>	28	<b>6.6</b>
Pentachlorophenol	87865	<b>Table A2</b> $= e^{((1.005 \cdot (\text{pH})) - 4.869)}$	<b>Table A2</b> $= e^{((1.005 \cdot (\text{pH})) - 5.134)}$
Phenol (Cold-water Aquatic Habitat)	108952	<b>[10,200]</b> <b>5,293</b>	<b>[2,560]</b> <b>157</b>
Phenol (Warm-water Aquatic)	108952	<b>[10,200]</b> <b>5,293</b>	2,560
Acrolein	107028	3	3
Aldrin	309002	3	
<b>Carbaryl</b>	<b>63252</b>	<b>2.1</b>	<b>2.1</b>
Chlordane	57749	<b>2.4</b>	<b>0.0043</b>
Chlorpyrifos	2921882	<b>0.083</b>	<b>[0.04]</b> <b>0.041</b>
Diazinon	333415	<b>0.17</b>	<b>0.17</b>
4-4'- Dichlorodiphenyltrichloroethane (DDT)	50293	<b>1.1</b>	<b>0.001</b>
Dieldrin	60571	<b>0.24</b>	<b>0.056</b>
alpha-Endosulfan (Endosulfan)	959988	<b>[0.11]</b> <b>0.22</b>	0.056
beta-Endosulfan (Endosulfan)	33213659	<b>[0.11]</b> <b>0.22</b>	0.056
Endrin	72208	<b>0.086</b>	<b>0.036</b>
Heptachlor	76448	<b>0.52</b>	0.0038
Heptachlor Epoxide	1024573	<b>0.52</b>	<b>0.0038</b>
gamma-Hexachlorocyclohexane (gamma-BHC; Lindane)	58899	<b>0.95</b>	
Parathion	56382	<b>0.065</b>	<b>[0.04]</b>
Toxaphene	8001352	<b>0.73</b>	<b>0.0002</b>

### **C. MDNR's Definition of Waters of the State**

10 CSR 20-7.031(1)(EE) revises the Waters of the State definition:

*~~[(DD)]~~(EE) Waters of the state—As defined in section 644.016, RSMo.*

Section 644.016, RSMo, of the Missouri Clean Water Law provides:

(27) "Waters of the state", all waters within the jurisdiction of this state, including all rivers, streams, lakes and other bodies of surface and subsurface water lying within or forming a part of the boundaries of the state which are not entirely confined and located completely upon lands owned, leased or otherwise controlled by a single person or by two or more persons jointly or as tenants in common.

EPA approves Missouri's regulation, at 10 CSR 20-7.031(1)(EE). The regulation provides adequate authority to issue permits for the control of discharge of pollutants by existing and new point sources as required by the CWA. The definition of "waters of the state" is to be implemented by Missouri to include waters of the U.S., lying within the state, including "navigable waters" as defined by Section 502(7) of the CWA.

# ATTACHMENT 1 (EPA's 12/26/2019 WQS Action)



## PUBLIC NOTICE

### Multiple Discharger Variance for Ammonia Potentially Applicable Stream Segments

DATE: July 1, 2019

The Missouri Department of Natural Resources hereby places the following list of stream segments where the Multiple Discharger Variance (MDV) for ammonia may be applicable on public notice. The stream segments are listed in Table A, which begins on the following page. An interactive map of the stream segments can be found here:

<https://modnr.maps.arcgis.com/apps/PublicInformation/index.html?appid=762fc77946d94920b0c96bea979a7545>.

Stream segments are included in the list if the following apply:

- The stream segment is protected for the aquatic life designated use.
- A municipally-owned wastewater treatment facility discharges to the stream segment.
- The wastewater treatment facility is a facultative lagoon.

Stream segments will only be applicable if a discharger to the stream qualifies for the MDV and has the MDV incorporated into their Missouri State Operating Permit. Because the MDV application process is comprehensive and considers site-specific conditions, it is not possible for the Department to identify qualifying dischargers prior to application review.

Comments should be confined to the content and issues relating to the listed stream segments and whether or not the MDV could be issued to a discharge on the listed stream segments.

Comments will not be considered for the MDV Framework

(<https://dnr.mo.gov/env/wpp/rules/rir/docs/mdv-final-091517.pdf>), which has already gone through the public participation process.

Those interested in commenting on the list of stream segments are invited to submit comments in writing to the Department. Comments should be submitted by email at [wqs@dnr.mo.gov](mailto:wqs@dnr.mo.gov) or by mail to Attn: Angela Falls, Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, Missouri 65102. **All comments must be received or postmarked no later than August 9, 2019.**

Table A. Stream Segments Potentially Impacted by the MDV for Ammonia.

No.	WBID	Water Body Name	Class	County	HUC-8	Reach Code*	F-Measure*	T-Measure*
1	111	Black Cr.	P	Shelby	07110005	07110005000030	0.00	100.00
2	384	Keeney Cr.	C	Ray	10300101	10300101000703	0.00	100.00
3	2269	Opossum Cr.	P	Bollinger	07140107	07140107000806	0.00	88.17
4	2270	Opossum Cr.	C	Bollinger	07140107	07140107000806	88.17	100.00
5	3142	Ash Ditch	C	Scott	08020201	08020201000158	0.00	100.00
6	3112	Main Ditch	P	Dunklin	08020204	08020204005117	0.00	100.00
7	3094	Ditch #8	C	New Madrid	08020204	08020204001371	0.00	100.00
8	242	Tarkio R.	P	Atchison	10240005	10240005000055	0.00	100.00
9	267	Mace Cr.	C	Andrew	10240011	10240011000257	0.00	100.00
10	287	Elkhorn Cr.	C	Nodaway	10240010	10240010000030	0.00	100.00
11	657	Spring Cr.	P	Adair	10280202	10280202000074	0.00	100.00
12	1337	L. Clear Cr.	C	Vernon	10290105	10290105000544	0.00	8.91
13	369	Moss Cr.	P	Carroll	10300101	10300101008586	0.00	100.00
14	3960	8-20-13 MUDD V1.0	C	Lewis	07110001	07110001001413	0.00	6.55
15	3960	8-20-13 MUDD V1.0	C	Lewis	07110001	07110001001413	6.55	100.00
16	3960	8-20-13 MUDD V1.0	C	Schuyler	07110002	07110002000625	0.00	100.00
17	3960	8-20-13 MUDD V1.0	C	Lewis	07110002	07110002002810	0.00	100.00
18	3960	8-20-13 MUDD V1.0	C	Knox	07110004	07110004000298	0.00	100.00
19	3960	8-20-13 MUDD V1.0	C	Adair	07110005	07110005000615	0.00	100.00
20	3960	8-20-13 MUDD V1.0	C	Schuyler	07110005	07110005000162	0.00	100.00
21	3960	8-20-13 MUDD V1.0	C	Adair	07110005	07110005001136	0.00	6.99
22	3960	8-20-13 MUDD V1.0	C	Adair	07110005	07110005001136	6.99	20.36
23	3960	8-20-13 MUDD V1.0	C	Schuyler	07110005	07110005001136	20.36	100.00
24	3960	8-20-13 MUDD V1.0	C	Lincoln	07110008	07110008001306	0.00	100.00
25	3960	8-20-13 MUDD V1.0	C	Washington	07140104	07140104001093	0.00	100.00
26	3960	8-20-13 MUDD V1.0	C	Scott	07140107	07140107001837	27.45	100.00
27	3960	8-20-13 MUDD V1.0	C	Scott	07140107	07140107001837	0.00	27.45
28	3960	8-20-13 MUDD V1.0	C	Mississippi	08020201	08020201000380	0.00	100.00
29	3960	8-20-13 MUDD V1.0	C	Scott	08020201	08020201000855	65.19	100.00
30	3960	8-20-13 MUDD V1.0	C	Scott	08020201	08020201000855	0.00	65.19

\*See U.S. Geological Survey's publication "[National Hydrography Dataset – Linear Referencing](#)" for an explanation of reach codes and measures.



No.	WBID	Water Body Name	Class	County	HUC-8	Reach Code*	F-Measure*	T-Measure*
31	3960	8-20-13 MUDD V1.0	C	Stoddard	08020203	08020203004027	0.00	100.00
32	3960	8-20-13 MUDD V1.0	C	Scott	08020204	08020204005176	0.00	100.00
33	3960	8-20-13 MUDD V1.0	C	Stoddard	08020204	08020204010162	0.00	100.00
34	3960	8-20-13 MUDD V1.0	C	Caldwell	10280101	10280101000876	0.00	100.00
35	3960	8-20-13 MUDD V1.0	C	Livingston	10280103	10280103001780	0.00	100.00
36	3960	8-20-13 MUDD V1.0	C	Linn	10280103	10280103002254	0.00	100.00
37	3960	8-20-13 MUDD V1.0	C	Linn	10280103	10280103001820	0.00	100.00
38	3960	8-20-13 MUDD V1.0	C	Chariton	10280103	10280103002187	0.00	43.73
39	3960	8-20-13 MUDD V1.0	C	Chariton	10280103	10280103002187	43.73	100.00
40	3960	8-20-13 MUDD V1.0	C	Sullivan	10280202	10280202001177	0.00	100.00
41	3960	8-20-13 MUDD V1.0	C	Sullivan	10280202	10280202001170	0.00	100.00
42	3960	8-20-13 MUDD V1.0	C	Linn	10280202	10280202001235	0.00	100.00
43	3960	8-20-13 MUDD V1.0	C	Macon	10280202	10280202000413	0.00	100.00
44	3960	8-20-13 MUDD V1.0	C	St Clair	10290106	10290106000570	0.00	79.84
45	3960	8-20-13 MUDD V1.0	C	St Clair	10290106	10290106000570	79.84	100.00
46	3960	8-20-13 MUDD V1.0	C	St Clair	10290105	10290105000042	73.15	100.00
47	3960	8-20-13 MUDD V1.0	C	Vernon	10290105	10290105000544	18.07	19.04
48	3960	8-20-13 MUDD V1.0	C	Vernon	10290105	10290105000544	19.04	46.92
49	3960	8-20-13 MUDD V1.0	C	Vernon	10290105	10290105000544	46.92	50.03
50	3960	8-20-13 MUDD V1.0	C	Vernon	10290105	10290105000544	50.03	77.62
51	3960	8-20-13 MUDD V1.0	C	Barton	10290105	10290105000544	77.62	88.62
52	3960	8-20-13 MUDD V1.0	C	Barton	10290105	10290105000544	88.62	100.00
53	3960	8-20-13 MUDD V1.0	C	St Clair	10290105	10290105000042	0.00	73.15
54	3960	8-20-13 MUDD V1.0	C	Vernon	10290105	10290105000544	8.91	18.07
55	3960	8-20-13 MUDD V1.0	C	Dallas	10290110	10290110001417	0.00	100.00
56	3960	8-20-13 MUDD V1.0	C	Lafayette	10300101	10300101001396	0.00	100.00
57	3960	8-20-13 MUDD V1.0	C	Lafayette	10300101	10300101001591	0.00	24.60
58	3960	8-20-13 MUDD V1.0	C	Lafayette	10300101	10300101001591	24.60	100.00
59	3960	8-20-13 MUDD V1.0	C	Pettis	10300103	10300103000816	0.00	100.00
60	3960	8-20-13 MUDD V1.0	C	Morgan	10300103	10300103000516	0.00	100.00

\*See U.S. Geological Survey's publication "National Hydrography Dataset – Linear Referencing" for an explanation of reach codes and measures.

No.	WBID	Water Body Name	Class	County	HUC-8	Reach Code*	F-Measure*	T-Measure*
61	3960	8-20-13 MUDD V1.0	C	Pettis	10300103	10300103000588	0.00	100.00
62	3960	8-20-13 MUDD V1.0	C	Montgomery	10300200	10300200001137	0.00	100.00
63	3960	8-20-13 MUDD V1.0	C	Saline	10300104	10300104001052	0.00	100.00
64	3960	8-20-13 MUDD V1.0	C	Lafayette	10300104	10300104005339	0.00	100.00
65	3960	8-20-13 MUDD V1.0	C	Johnson	10300104	10300104001848	0.00	100.00
66	3960	8-20-13 MUDD V1.0	C	Barton	11070207	11070207002335	0.00	100.00
67	3960	8-20-13 MUDD V1.0	C	Jasper	11070207	11070207001113	62.86	85.94
68	3960	8-20-13 MUDD V1.0	C	Jasper	11070207	11070207001113	0.00	62.86
69	3960	8-20-13 MUDD V1.0	C	Jasper	11070207	11070207000594	0.00	47.65
70	3960	8-20-13 MUDD V1.0	C	Jasper	11070207	11070207000594	47.65	100.00
71	2893	Stouts Cr.	P	Iron	08020202	08020202000220	0.00	100.00
72	3120	Pole Cat Slough	P	Dunklin	08020204	08020204003996	0.00	100.00
73	596	Hickory Br.	C	Chariton	10280103	10280103002200	0.00	100.00
74	606	Locust Cr.	P	Sullivan	10280103	10280103000272	0.00	100.00
75	649	Old Chan. Chariton R.	C	Schuyler	10280201	10280201001305	0.00	100.00
76	649	Old Chan. Chariton R.	C	Putnam	10280201	10280201001303	0.00	100.00
77	1090	Fly Cr.	P	Maries	10290111	10290111000564	0.00	100.00
78	3821	Modoc Cr.	C	Montgomery	10300200	10300200001078	0.00	100.00
79	3960	8-20-13 MUDD V1.0	C	Clark	07110001	07110001001327	0.00	100.00
80	3960	8-20-13 MUDD V1.0	C	Schuyler	07110002	07110002000836	0.00	100.00
81	3960	8-20-13 MUDD V1.0	C	Shelby	07110004	07110004000524	0.00	100.00
82	3960	8-20-13 MUDD V1.0	C	Randolph	07110006	07110006000103	0.00	100.00
83	3960	8-20-13 MUDD V1.0	C	Ralls	07110007	07110007000235	0.00	100.00
84	3960	8-20-13 MUDD V1.0	C	Audrain	07110008	07110008000731	0.00	100.00
85	3960	8-20-13 MUDD V1.0	C	Montgomery	07110008	07110008001198	0.00	56.71
86	3960	8-20-13 MUDD V1.0	C	Gasconade	07140103	07140103000672	0.00	100.00
87	3960	8-20-13 MUDD V1.0	C	Crawford	07140103	07140103000289	0.00	100.00
88	3960	8-20-13 MUDD V1.0	C	Scott	08020204	08020204000592	0.00	100.00
89	3960	8-20-13 MUDD V1.0	C	Dunklin	08020204	08020204004415	0.00	97.52
90	3960	8-20-13 MUDD V1.0	C	Holt	10240005	10240005003422	0.00	100.00

\*See U.S. Geological Survey's publication "[National Hydrography Dataset – Linear Referencing](#)" for an explanation of reach codes and measures.

No.	WBID	Water Body Name	Class	County	HUC-8	Reach Code*	F-Measure*	T-Measure*
91	3960	8-20-13 MUDD V1.0	C	Nodaway	10240012	10240012002497	0.00	100.00
92	3960	8-20-13 MUDD V1.0	C	Clinton	10240012	10240012000349	0.00	100.00
93	3960	8-20-13 MUDD V1.0	C	Nodaway	10240012	10240012002779	0.00	100.00
94	3960	8-20-13 MUDD V1.0	C	Caldwell	10280101	10280101016568	0.00	100.00
95	3960	8-20-13 MUDD V1.0	C	Caldwell	10280101	10280101016462	0.00	100.00
96	3960	8-20-13 MUDD V1.0	C	Worth	10280101	10280101004520	0.00	100.00
97	3960	8-20-13 MUDD V1.0	C	Daviess	10280101	10280101011008	0.00	100.00
98	3960	8-20-13 MUDD V1.0	C	Harrison	10280101	10280101001328	0.00	100.00
99	3960	8-20-13 MUDD V1.0	C	Caldwell	10280101	10280101000570	0.00	100.00
100	3960	8-20-13 MUDD V1.0	C	Gentry	10280101	10280101000781	2.35	12.94
101	3960	8-20-13 MUDD V1.0	C	Harrison	10280101	10280101001325	0.00	95.99
102	3960	8-20-13 MUDD V1.0	C	Mercer	10280102	10280102001206	0.00	100.00
103	3960	8-20-13 MUDD V1.0	C	Harrison	10280102	10280102001077	0.00	100.00
104	3960	8-20-13 MUDD V1.0	C	Linn	10280103	10280103001798	0.00	100.00
105	3960	8-20-13 MUDD V1.0	C	Putnam	10280201	10280201001304	0.00	100.00
106	3960	8-20-13 MUDD V1.0	C	Bates	10290102	10290102000759	0.00	100.00
107	3960	8-20-13 MUDD V1.0	C	Vernon	10290104	10290104003659	0.00	100.00
108	3960	8-20-13 MUDD V1.0	C	Dade	10290106	10290106000072	0.00	100.00
109	3960	8-20-13 MUDD V1.0	C	Cass	10290108	10290108001389	0.00	100.00
110	3960	8-20-13 MUDD V1.0	C	Johnson	10290108	10290108001075	0.00	100.00
111	3960	8-20-13 MUDD V1.0	C	Cass	10290108	10290108000583	0.00	100.00
112	3960	8-20-13 MUDD V1.0	C	Laclede	10290110	10290110000486	0.00	73.85
113	3960	8-20-13 MUDD V1.0	C	Clinton	10300101	10300101002237	0.00	100.00
114	3960	8-20-13 MUDD V1.0	C	Lafayette	10300101	10300101001571	0.00	100.00
115	3960	8-20-13 MUDD V1.0	C	Clinton	10300101	10300101000212	0.00	100.00
116	3960	8-20-13 MUDD V1.0	C	Randolph	10300102	10300102006629	72.53	76.01
117	3960	8-20-13 MUDD V1.0	C	Randolph	10300102	10300102006629	0.00	72.53
118	3960	8-20-13 MUDD V1.0	C	Pettis	10300103	10300103001044	0.00	100.00
119	3960	8-20-13 MUDD V1.0	C	Howard	10280203	10280203000341	0.00	100.00
120	3960	8-20-13 MUDD V1.0	C	Reynolds	11010007	11010007001675	0.00	95.40

\*See U.S. Geological Survey's publication "National Hydrography Dataset – Linear Referencing" for an explanation of reach codes and measures.

No.	WBID	Water Body Name	Class	County	HUC-8	Reach Code*	F-Measure*	T-Measure*
121	3960	8-20-13 MUDD V1.0	C	Saline	10300104	10300104002265	0.00	100.00
122	3960	8-20-13 MUDD V1.0	C	Saline	10300104	10300104000599	0.00	100.00
123	3960	8-20-13 MUDD V1.0	C	Iron	08020202	08020202001285	0.00	100.00
124	3960	8-20-13 MUDD V1.0	C	Nodaway	10240013	10240013000042	0.00	100.00
125	3960	8-20-13 MUDD V1.0	C	Clark	07110001	07110001001750	0.00	100.00
126	3960	8-20-13 MUDD V1.0	C	Sullivan	10280103	10280103001491	0.00	100.00
127	242	Tarkio R.	P	Atchison	10240005	10240005000151	0.00	100.00
128	3960	8-20-13 MUDD V1.0	C	Lewis	07110002	07110002001009	0.00	51.17
129	3960	8-20-13 MUDD V1.0	C	Daviess	10280101	10280101000706	0.00	42.64
130	3960	8-20-13 MUDD V1.0	C	Dekalb	10240012	10240012004073	0.00	100.00
131	3960	8-20-13 MUDD V1.0	C	Livingston	10280101	10280101000853	0.00	100.00
132	538	Mud Cr.	P	Caldwell	10280101	10280101000544	0.00	100.00
133	273	Bee Cr.	C	Buchanan	10240011	10240011000879	0.00	100.00
134	150	Lick Cr.	C	Ralls	07110007	07110007001829	0.00	100.00
135	3960	8-20-13 MUDD V1.0	C	Chariton	10280203	10280203000802	0.00	100.00
136	3960	8-20-13 MUDD V1.0	C	Lincoln	07110008	07110008001674	0.00	100.00
137	3960	8-20-13 MUDD V1.0	C	Callaway	10300102	10300102004620	0.00	100.00
138	3960	8-20-13 MUDD V1.0	C	Montgomery	07110008	07110008001294	0.00	100.00
139	3960	8-20-13 MUDD V1.0	C	Cooper	10300102	10300102001434	0.00	60.56
140	842	Baileys Cr.	P	Osage	10300102	10300102000823	0.00	100.00
141	3960	8-20-13 MUDD V1.0	C	Moniteau	10300102	10300102001217	0.00	100.00
142	3960	8-20-13 MUDD V1.0	C	Callaway	10300102	10300102001598	0.00	100.00
143	3960	8-20-13 MUDD V1.0	C	Pettis	10300103	10300103001113	0.00	100.00
144	3960	8-20-13 MUDD V1.0	C	Gasconade	07140103	07140103000592	0.00	100.00
145	3960	8-20-13 MUDD V1.0	C	Miller	10290111	10290111000426	0.00	100.00
146	3319	Trib. to S. Fk. Weaubleau Cr.	C	St Clair	10290105	10290105000351	0.00	100.00
147	3960	8-20-13 MUDD V1.0	C	Stoddard	08020204	08020204000247	0.00	100.00
148	2785	Williams Cr.	C	Wayne	11010007	11010007000756	0.00	100.00
149	3041	Old Chan. Little R.	P	Scott	08020204	08020204000060	0.00	100.00
150	3137	Lee Rowe Ditch	C	Mississippi	08020201	08020201000308	0.00	65.97
151	3960	8-20-13 MUDD V1.0	C	Cooper	10300104	10300104002333	0.00	100.00

\*See U.S. Geological Survey's publication "[National Hydrography Dataset – Linear Referencing](#)" for an explanation of reach codes and measures.



# Multiple Discharger Variance Framework: Total Ammonia Nitrogen

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**CWC-MDV-1-17**

September 15, 2017

This document sets forth the framework of Missouri's multiple discharger variance from the water quality standards for total ammonia nitrogen. This multiple discharger variance applies to well-functioning, multi-celled, facultative lagoon systems where residents of a community would experience a substantial and widespread social and economic impact if required to upgrade their current lagoon system to meet the water quality standards for total ammonia nitrogen.

# Missouri Multiple Discharger Variance Framework

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Missouri Multiple Discharger Variance  
From the Water Quality Standards  
Of Total Ammonia Nitrogen  
CWC-MDV-1-17, September 15, 2017

1. Pollutant: The State of Missouri hereby adopts the variance from the water quality standard (WQS) for total ammonia nitrogen for the protection of aquatic life designated use for dischargers that meet the conditions and requirements of the Multiple Discharger Variance (MDV) Framework. The WQS for total ammonia nitrogen can be found in state regulation at 10 CSR 20-7.031(5)(B)7 and Table B of the Water Quality Standards.
2. Designated Use: Protection of Aquatic Life (AQL).
3. Qualifying Dischargers: The potential applicants for the MDV includes minor municipal, Publicly Owned Treatment Works (POTW), multi-celled facultative lagoon systems where the residents of the community would experience a substantial and widespread social and economic impact if required to comply with the WQS used to derive the water quality based effluent limit (WQBEL) for total ammonia nitrogen. To qualify for this variance, the applicant's lagoon system must meet the standards of a well-functioning lagoon system, receive an engineering evaluation completed by a Missouri Department of Natural Resources engineer, and all three economic analyses with results that have determined all viable wastewater treatment and treatment alternatives to meet the WQS would result in a substantial and widespread social and economic impact. The three economic analyses are the Cost Analysis for Compliance (CAFCom) that is written by the Department, the alternatives analysis, and the Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities (WESI) both of which are submitted with the MDV application. The processes on how the Department makes the substantial impact determination on all three analyses are explained below in Appendix C.

When assessing the applicants that will qualify for this variance, it is important to consider that 66 percent of Missouri's municipal, POTW, facultative lagoon systems are located in communities with a total population of less than 600 people. Therefore, it is expected that the majority of communities that would qualify for the variance would have a design flow or documented actual flow of 60,000 gallons per day (gpd) or less. It is also important to consider that 66 percent of Missouri's municipally owned facultative lagoon systems are located in communities that have experienced a decrease in population over the past ten years. It is anticipated that a majority of the potential applicants that would qualify for this variance are small rural communities that have experienced and are expected to continue to experience a decrease in population over the term of the variance.

The requirements of well-functioning lagoon systems are found in Appendix A, the template of the Field Engineer Evaluation can be found in Appendix B, and the application for the MDV can be found in Appendix C.

4. Underlying Use: The receiving waterbody of each qualifying permit holder that is approved for the variance will retain its underlying designated use of Protection of Aquatic Life (AQL) and ammonia criteria for purposes other than permit effluent limits. All other WQS not specifically addressed by the variance continue to apply in those waters for all Clean Water Act purposes. The WQS for total ammonia nitrogen for all other permit holders will remain as stated in state regulation at 10 CSR 20-7.031 (5)(B)7 and Table B.

5. Currently Attained Water Quality: Implementation of this MDV will not result in any lowering of existing water quality. Pursuant 40 CFR§131.14, each facility is required to implement the pollution minimization plan (PMP) as specified in Appendix A, as well as the highest attainable effluent conditions (HAC) explained below. The PMP as defined in 40 CFR§131.3(p) is a set of enforceable activities to improve processes and pollutant controls that will prevent and reduce pollutant loadings. The PMP is a requirement through the term of the variance for all MDV recipients. Further, it was determined that the population has declined and is expected to continue to decline in 66 percent of Missouri's municipalities that operate a publicly owned facultative lagoon system (shown in Appendix G). As the populations decrease, the discharge flows should diminish and thus the likelihood of increased water pollution.
6. Permit Use Only: This variance will be used solely to establish effluent limits for total ammonia nitrogen within permits. The variance will not be used for any other Clean Water Act or Missouri Clean Water Law purposes.
7. Factor Precluding Attainment: 40 CFR § 131.10(g)(6) – Controls more stringent than those required by Sections 301(b) and 306 of the Act would result in substantial and widespread social and economic impacts. The basis for this request is 40 CFR§131.10(g)(6), meaning that each applicant will submit justification that it is infeasible to meet the WQBEL that is as stringent as necessary to meet the applicable WQS for total ammonia nitrogen and that compliance would result in substantial and widespread social and economic impacts among the residents of the community.

Substantial Impact Analysis: The substantial impact analysis conducted will use site-specific information from each applicant and be completed at the time of the applicant's regularly scheduled permit renewal process. The Department has determined a three step process for each community to justify substantial impacts will occur as a result of compliance with WQS.

Step 1: The first step to determine if the permit holder is eligible for the variance is during the permit renewals process as Department staff is required to conduct a CAFCom per Missouri Revised Statutes (RSMo) §644.145, RSMo. A copy of §644.145, RSMo can be found in Appendix D. The referenced Missouri Statute requires Department staff to consider eight criteria related to the community's financial capability, current debt related to wastewater upgrades, socioeconomic demographics, the new costs incurred, and the potential benefits of the new requirements within the permit. The Department's CAFCom analysis uses CAPDEWORKS (CapDet) to estimate the cost for a mechanical treatment plant designed to meet a monthly average ammonia effluent limit of 0.6 mg/L, with an assumed a peaking factor of 3:1, and with assumed normal strength municipal wastewater characteristics. A no discharge option of a wastewater irrigation system is also included in the analysis. The cost estimated within each CAFCom is based on their permitted design flow and the number of active connections provided with the permit application. The cost of land is included with the estimated cost to convert to a no-discharge wastewater irrigation system and it determined based on city data found in the in the State of Missouri, published in the 2012 Census of Agriculture by the United States Department of Agriculture (USDA). CapDet is explained in detail in Appendix D.

The CAFCom utilizes a matrix design (Figure 1) which pairs the residential indicator with the financial capability indicator score to determine the category in which the municipality will experience a financial burden if required to comply with the WQS of total ammonia nitrogen. The categories are described as a low, medium, or high burden. The residential indicator is the projected user cost as a percentage of the municipality's median household income (MHI). The

financial capability indicator is calculated after analyzing the municipality's bond rating, overall net debt as a percentage of full market property value, unemployment rate, MHI as compared to the State's MHI, percentage of the population below poverty level as compared to the percent of population below poverty level within the State of Missouri, percent of households receiving food stamps as compared to the percent of households receiving food stamps within the State of Missouri, property tax revenues as a percentage of full market property value, and property tax collection rate. The each category is given a score of weak (1 point), mid-range (2 points), or strong (3 points) and the scores are averaged. The averaged value is the financial capability score.

**Figure 1: The Department's Financial Capability Matrix.**

**Financial Capability Matrix:**

<b>Financial Capability Indicators Score from above ↓</b>	<b>Residential Indicator (User cost as a % of MHI)</b>		
	<b>Low (Below 1%)</b>	<b>Mid-Range (Between 1.0% and 2.0%)</b>	<b>High (Above 2.0%)</b>
<b>Weak (below 1.5)</b>	Medium Burden	High Burden	High Burden
<b>Mid-Range (1.5 – 2.5)</b>	Low Burden	Medium Burden	High Burden
<b>Strong (above 2.5)</b>	Low Burden	Medium Burden	High Burden

To justify substantial impacts, the matrix must conclude the residents of the municipality will endure a "high financial burden" or a "medium financial burden" with a residential indicator of greater than or equal to 1.5 percent and the financial capability indicator as "weak" or "mid-range" to meet WQS for total ammonia nitrogen.

Once the CAFCom has indicated the permit holder is a potential candidate for the MDV, the permit holder will be contacted to submit an application for the MDV. The Department's variance coordinator will also be contacted at this time to ensure the permit holder has the necessary resources available to complete the application process.

Step 2: The second step in the determination of a qualifying applicant is the completion of the alternatives analysis. The alternatives analysis is a section of the MDV application process to estimate the cost of alternative treatment options that would enable the facility's compliance with WQS. If necessary, Department staff will assist the applicant with the completion of the alternatives analysis to estimate the cost of: installing a subsurface soils dispersion, regionalization, and relocation the outfall to a receiving stream with appropriate mixing considerations. The results from the analysis will provide the community with a residential indicator for each alternative treatment option. The residential indicator will be used in the Department's financial capability matrix in conjunction with the financial capability score found in the CAFCom. To be eligible for the MDV, the alternatives analysis for each permit holder should indicate that each alternative option will also result in a "high burden" or a "medium burden" with a residential indicator of greater than or equal to 1.5 percent and a "weak" or "mid-range" financial capability indicator. See Appendix C for a demonstration of the alternatives analysis.

Step 3: The final step in the determination of substantial impact is the completion of the supplemental spreadsheet to the 1995 Interim Economic Guidance for Water Quality Standards (EPA-823-B-95-002), Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities (WESI). The WESI is conducted in a two-step process and utilizes a matrix (Figure 2) to analyze if compliance with the WQS for total ammonia nitrogen will cause a substantial impact. With the assistance from Department staff, the applicant will use the estimated costs from the CAFCom to conduct the WESI analysis. The first part of the

WESI analysis is to determine the municipal preliminary screener (MPS). The WESI refers to the residential indicator as the MPS which is the estimated cost to upgrade as a percent of the community's MHI. The WESI also requires the applicant to conduct a secondary test which is calculated after analyzing the community's bond rating, overall net debt per capita, unemployment rate as compared to the national average, MHI as compared to the State's MHI, property tax revenues as a percentage of full market property value, and property tax collection rate. The each category is given a score of weak (1 point), mid-range (2 points), or strong (3 points) and the scores are averaged for a secondary score.

**Figure 2: U.S. Environmental Protection Agency's (EPA's) Substantial Impacts Matrix.**

This matrix can be found at <https://www.epa.gov/sites/production/files/2014-09/usespublic.xlsx>.

Secondary Score	Municipal Preliminary Screener		
	Less than 1.0 Percent	Between 1.0 and 2.0 Percent	Greater than 2.0 Percent
Less than 1.5	?	X	X
Between 1.5 and 2.5	✓	?	X
Greater than 2.5	✓	✓	?

To justify substantial impacts, the matrix must conclude that a determination of “impact is likely to be substantial” or “impact is unclear” with a MPS of greater than or equal to 1.5 percent and the secondary test score less than or equal to 2.5 would occur if required to meet WQS for total ammonia nitrogen. If the impact is determined to be “unclear”, the applicant is still eligible for a variance from the water quality standards of total ammonia nitrogen, and their financial capability will be reviewed during the next permit renewal cycle. Appendix D provides a detailed explanation of the WESI and CAFCom and how the two analyses support the justification for a substantial impact.

Widespread Analysis: The EPA designates substantial impacts to also be widespread if they will have significant adverse impacts on the local community. The Department has considered a variety of social demographics that have an adverse effect on the community's ability to repay a significant loan associated with the total present worth of a treatment system designed to meet WQS for total ammonia nitrogen.

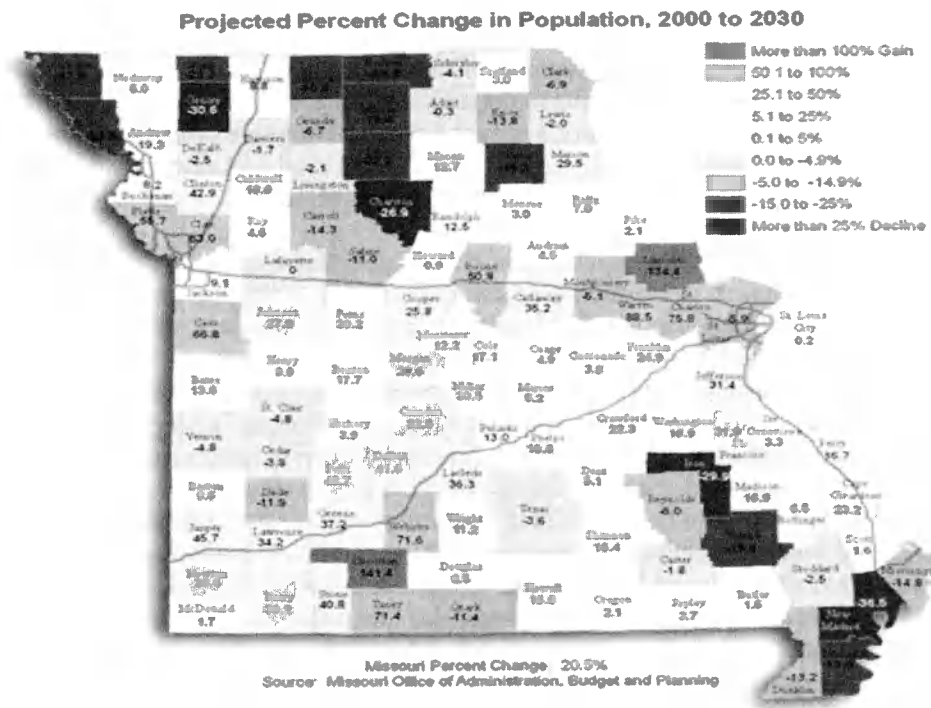
The Department partnered with Wichita State University's Environmental Finance Center to create a tool called the Missouri Sustainability Tool (MoSAT) to study the sustainability of rural communities within Missouri. The MoSAT tool is based on a statistical linear regression model to determine each rural Missouri town's ability to sustain over time (Appendix F). A rural town was determined to be a community with a population of less than 10,000 and not within a metropolitan district. It was determined that Missouri contains 745 rural towns. The study allows the Department to look closely at 19 weighted demographics and economic factors called “sustainability factors” which research has shown to predict future changes in rural population for each individual rural town. The 19 sustainability factors are listed in Appendix F. The study assigned a category score of 1 to 5 for each rural community based on the combined scores of the

19 sustainability factors. Category 1 and Category 2 communities are determined to be facing more challenging socioeconomic circumstances and over time as they are predicted to experience significant declines in both financial capability and population. Category 3 communities are projected to be relatively stable communities; however, a swing in any of the 19 sustainability factors that are characterized in Appendix F would have an impact on the community's ability to sustain in the future. Category 4 and 5 communities have been determined to be thriving and are predicted to see a growth in economies and population over time. The study determined that 41.6 percent of Missouri's rural communities fit the mold of Category 1 or 2 communities, 29.4 percent are determined to be a Category 3 community, and 29.0% are determined to be Category 4 and 5 communities. Therefore, 41.6 percent of Missouri's rural communities are predicted to decline in both financial capability and in population over the next 20 years.

The sustainability of Missouri's rural communities is important to consider during the MDV process as adverse impacts to Missouri's overall economy are at risk if a community is unable to fully amortize a significant loan needed to upgrade or replace the wastewater treatment system to comply with water quality standards for total ammonia nitrogen. The reality is that communities with declining in populations rely on inexpensive funding options such as grants from the Federal and State governments to fund schools, transportation, and infrastructure improvements. As federal and state subsidies continue to decline, financial burden will increase on small local governments. This will lower the overall financial capability of local governments with declining populations as they will have less capacity to raise utility rates or property taxes as they are laden with competing health, education, and environmental needs. Also, the decline in population will cause the burdensome sewer rates to continue to increase as there is less of an active connection base to pay. If an MDV applicant that has passed the substantial burden test is required to upgrade their current well-functioning, multi-celled, facultative lagoon system to a meet water quality standards for total ammonia nitrogen; widespread economic and social impact throughout the State of Missouri will occur as the remaining residents of the local governments will struggle to keep up with debt payments and funding the necessary operation and maintenance of the new infrastructure.

A map of Missouri showing the projected percent change in population of Missouri counties from 2000 to 2030 is also provided as Figure 3 below. The map reflects the geographical areas that will experience the most declines in population. The projections show that northern Missouri and southeastern Missouri are projected to experience significant declines in population by the year 2030. The counties shown in the various shades of red and orange below represent a majority of the rural communities within the State of Missouri. As shown in Figure G-1 in Appendix G, the population trend is projected out to 2030 is projected to continue to follow the same path from 2000 to 2010. Populations will continue to shift from rural areas of Missouri to urban areas, suburban areas, and rural areas rich in recreational amenities. As rural populations decline other factors will also contribute to the overall sustainability of the community as well such as fewer job and educational opportunities, less access to healthcare, and fewer housing options. Also, as stated above, a declining population will increase the financial burden placed on the remaining rate payers as their rates will increase to account for the inactive connections.

**Figure 3: Projected Percent Change in Population (2000 to 2030).** The map was developed by the planning and budget section of the office of administration and can be found at [https://www.missourieconomy.org/indicators/population/pop\\_proj\\_2030.stm](https://www.missourieconomy.org/indicators/population/pop_proj_2030.stm).



The Department considered a variety of social demographics that are known to contribute to the overall financial capability and sustainability of a community as well as social demographics of the potential applicants as compared to the social demographics of the State of Missouri. The data collected by the Department's economist is from the 2000 and 2010 U.S. Census as well as the latest American Community Survey 5-year estimates. According to the Environmental Finance Center at Wichita State University, the largest contributor to the overall sustainability of a community is the change in population from 2000 to 2010. The Change in Population pie graph in Appendix G shows that 66 percent of Missouri's municipalities with a publicly owned facultative lagoon system have experienced a decrease on population from 2000 to 2010. Through the discussions that the Department has with local government staff while drafting their CAFCom the staff have reported that they are continuing to experience decreases within their populations. Further, another demographic that is vital to the sustainability and the ability of a community to repay a significant loan is the percentage of the community over the age of 50. The bar graph in Appendix G details that 178 of the 207 municipally owned facultative lagoon communities reported 30.01 percent to 50 percent of their population is over the age of 50. Communities with a population of less than 1,000 people with a large portion of the population that is aging have reported to the Department difficulties in establishing an acceptable debt instrument such as: voted bond authority, general obligation bonds, and sales tax revenue in order secure the necessary funding to complete an upgrade to the facility in which rates would need to be substantially raised. Each potential applicant's individual financial situation will be analyzed during the permit renewal process using the Department's CAFCom to ensure the appropriate need exists and the resulting financial impact is deemed as a substantial and widespread social and economic impact.

Please see Appendix F for further details on Missouri's Sustainability Assessment Tool and Appendix G for further detail on the widespread impact placed on the residents due to meeting the WQS for total ammonia nitrogen.

8. Highest Attainable Effluent Conditions: No additional feasible ammonia control could be identified that would routinely meet ammonia criteria. Until more data is gained, the Department is not aware of lagoon enhancements that will reliably and consistently meet water-quality based ammonia criteria that are affordable. Therefore, the Department requests that the WQS for total ammonia nitrogen be varied to the highest attainable effluent condition of the applicant's well-functioning lagoon which will be reflected in the applicant's permit as the final effluent limitation. The Department has determined two scenarios that are used to establish the highest attainable effluent condition.

Scenario 1: The Department will determine the site specific seasonal highest attainable effluent conditions for each individual applicant by using their past five years of reported data for total ammonia nitrogen. The 95<sup>th</sup> and 99<sup>th</sup> percentiles from the reported concentrations will be determined for each individual applicant. The 95<sup>th</sup> percentile is to be the final effluent limit in the form of the monthly average and the 99<sup>th</sup> percentile is to be the final effluent limit in the form of the daily maximum.

Scenario 2: If the applicant's well-functioning facility is meeting the total ammonia nitrogen criteria during one season but not the other, the current criteria for total ammonia nitrogen will remain as the water quality based effluent limit during the season in which the facility can treat to the criteria level. The season, in which the facility cannot meet the current criteria, the permit will be issued with the highest attainable effluent limits as the monthly average and the daily maximum based on the 95<sup>th</sup> and 99<sup>th</sup> percentile of the facility's current performance.

The most protective water quality condition is determined to be the highest attainable effluent condition and is reflected as the final effluent limits within the permit. Because the highest attainable effluent conditions are reflective of the facility's current performance, the permits will be issued with final effluent limits and no schedule of compliance to meet total ammonia nitrogen. Appendix A contains both the Highest Attainable Effluent Conditions Analysis which provides a detailed technical report on how to calculate the highest attainable effluent conditions for lagoon systems and the PMP which each permit holder issued a permit under the terms and conditions of the MDV are required to meet.

9. Pollution Minimization Program: A PMP is required by 40 CFR§131.14 for any water quality standards variance when no additional feasible pollutant control technology can be identified and the highest attainable effluent condition is adopted by the State as the water quality standard. A PMP is defined in 40 CFR§131.3(p) as a structured set of activities to improve processes and pollutant controls that will prevent and reduce pollutant loadings. During the 20 year variance, the PMP is a requirement of the MDV and each municipality issued a permit incorporating the terms and conditions of the MDV is obligated to meet all requirements of the PMP. The requirements of the PMP are as follows:

- a. The facility shall meet the standard of a well-functioning lagoon system;
- b. A certified operator must be maintained;
- c. The facility shall be well maintained;
- d. The facility shall meet equivalent to secondary treatment requirements;

- e. The facility must meet the highest attainable effluent conditions reflected as final effluent limits within their permit;
- f. The permit holder shall not accept new industrial waste containing significant ammonia concentrations as influent to the facility;
- g. The lagoon must be designed to have no more than 25 percent loss of its design detention time as guidance recommends in the 10 States Standards<sup>1</sup>;
- h. The permit holder shall measure sludge depth and report the depth to the Department during the variance application process and with each subsequent permit renewal application;
- i. The permit holder shall actively engage with the Department when compliance assistance is needed;
- j. The permit holder is to report any improved processes and controls that have been or will be implemented to prevent and reduce pollutant loadings using the PMP Annual Report Form;
- k. The permit holder must provide the Department with adequate financial documentation during the application process and permit renewals so that the Department can make an informed decision on whether or not the community would endure a substantial and widespread social and economic impact as a result of meeting the WQS of total ammonia nitrogen; and
- l. The permit holder must provide the Department with assurance that no threatened or endangered species and/or their habitats are adversely affected as a result of this variance. (see Appendix C)

If the permit holder has not complied with the PMP, has committed a Group 1 Violation as defined in the Department's Procedure for Assistance, Compliance, and Enforcement (PACE) manual, and/or water quality of the stream has been adversely impacted by the permit holder, the permit holder will be referred to enforcement. Group 1 Violations are the most serious and significant impacts or threats to human health and the environment. There is a list of Group 1 Violations found in Appendix A. These violations must be addressed through the issuance of a Referral Notice of Violation (RNOV) and by immediate referral for program enforcement action.

10. **Public Participation:** Each permit that is covered under the MDV framework will contain language within the fact sheet that states a variance has been granted from the water quality standards for total ammonia nitrogen and the date at which the variance will expire. The permit will be public noticed for 30-days per 10 CSR 20-6.020 and available for public viewing at <http://dnr.mo.gov/env/wpp/permits/pn/index.html>.

This MDV framework is incorporated by reference in 10 CSR 20-7.031 and therefore, will also be reviewed during each triennial review in compliance with 33 U.S.C. §1313(c). After permits are issued under the terms and conditions of this MDV Framework; the municipality name, facility name, Missouri State Operating Permit number, receiving stream name, first classified water body identification (WBID) number, 8-digit hydrologic unit code (HUC 8), discharge location in Universal Transverse Mercator (UTM) coordinates, permit effective date, numeric highest attainable effluent conditions, and variance expiration date for each recipient of the variance will be tracked in a table found on the department's website at: <http://dnr.mo.gov/env/wpp/permits/wqs-variances.htm>. During the triennial review process, permits issued with MDV requirements and the information provided on the department's website will be incorporated into a table within 10 CSR 20-7.031 as the applicable WQS for total ammonia nitrogen.



Through the drafting of this document, this MDV Framework was placed on public notice twice. The first public notice period was a 30 day period starting on May 6 through June 6, 2016. The second public notice was a 30 day period starting on March 1 through March 30, 2017. The comments and comment response letters from the second public notice can be found on <http://dnr.mo.gov/env/wpp/permits/wqs-variances.htm>. Further this MDV Framework has gone through the formal stakeholder engagement process as it has been a standing item on the agenda during the Missouri Clean Water Forum.

11. **Term:** The term of the MDV is 20 years from the date EPA approves the amendment to 10 CSR 20-7.031 as the MDV Framework is incorporated by reference within this document. The Department finds a 20-year variance is the appropriate time necessary to ensure each permittee that is in need of the variance from the WQS of total ammonia nitrogen received adequate technical, managerial, and financial training, guidance, and assistance to support the municipality's future growth and sustainability. The MDV will be implemented during the permit renewal process. Therefore, not every permit issued under the MDV will receive the variance for a total time of 20 years. Because the Department permit renewal occurs once every 5 years on a rolling cycle, all potential applicants should be analyzed for applicability for the variance within the first 5 years of the MDV. Therefore, each recipient should receive a minimum of 3 permit cycles (15 years) to optimize lagoon operations.

The first permit cycle, Department staff will provide the permit holder with one-on-one technical, managerial, and financial training and guidance to implement the designed plan. Department staff will conduct meetings with municipal staff to discuss the needs of the community. The Department is committed to provide the municipality with the information and tools to optimize operations at the facility and empower municipalities to make informed, common sense decisions on wastewater infrastructure optimization and upgrades.

The permit holder would then have two remaining permit cycles to work on the prioritized goals provided by the Department's individualized lagoon assessment.

Further, consultation with treatment plant engineers indicates that no low cost technologies that continuously meet the water quality standards for total ammonia nitrogen that could be affordable by small communities are foreseen within the term of this variance.

12. **Re-evaluation:** This request for the MDV exceeds five years in length. The MDV framework will be re-evaluated every five years by the Department after the MDV becomes effective. The re-evaluation that is completed on the MDV framework will include an evaluation of all approved ammonia control technologies, as well as an evaluation on the effectiveness of the PMP to ensure that degradation of water quality has not occurred during the term of the variance. If the re-evaluation of the MDV framework indicates that a feasible option exists for permit holders that would allow for compliance with the water quality standards for total ammonia nitrogen, the permits will be modified and issued with a schedule of compliance to meet WQBEL based on the underlying water quality standards for total ammonia nitrogen. The re-evaluation of the MDV framework will be sent to EPA within 30 days of the re-evaluation. If the Department fails to provide EPA with the results from the re-evaluation within 30 days, the MDV shall be null and void until such time the state completes and submits the reevaluation to EPA.

The Department will also conduct a re-evaluation of the MDV during the permit renewal process for each permit holder with a Missouri State Operating permit issued with MDV requirements. The re-evaluation will consist of evaluating the permit holder's financial capability, highest

attainable effluent conditions, and a review of their PMP reports. The Department will conduct a new CAFCom during the permit renewal process based on any new financial and/or socio-economic and/or demographic information. The financial conditions re-evaluated will determine if the substantial and widespread social and economic impacts placed on the community continue to exist. If improvements to the financial capability of the permit holder occur during the term that would enable compliance with WQS by installing a mechanical plant or conversion to a no discharge system; the variance will be removed from the permit and the permit holder will be provided with a schedule of compliance to meet WQBEL for the WQS for total ammonia nitrogen. Any changes made during the permit renewal process will be effective after a 30-day public notice pursuant 10 CSR 20-6.020.

In addition, the HAC will be recalculated during each permit renewal process to ensure that the HAC is reflected during the term of the variance. If it is determined that the permittee can comply with more stringent HAC due to a new technology determined feasible or the current facility has been optimized to produce a higher attainable effluent quality, the more stringent HAC will be placed into the permit as a final effluent limit for total ammonia nitrogen. A re-evaluation of the PMP will also occur during the permit renewal cycle. If an additional item or items of the PMP have been determined necessary to produce a more stringent HAC during the term of the variance; the PMP will be adjusted to reflect those requirements during the permit renewal process. Any changes made during the permit renewal process will be effective after a 30-day public notice pursuant 10 CSR 20-6.020.

### 13. Threatened or Endangered Species Listed Under Section 4 of the Endangered Species

Act: All variance applicants are required to provide results from the Natural Heritage Review Report. The permit holder will submit a query to the Missouri Department of Conservation requesting information about species and natural communities of conservation concern at the point of discharge. The results will indicate whether or not federally-listed and/or state-listed threatened or endangered species (including those proposed for listing) and/or critical habitat (designated or proposed) are located at the point of discharge. If results indicate that a federally-listed and/or state listed threatened or endangered species and/ or their critical habitat are currently at or near the point of discharge, the applicant is to provide the list of the threatened or endangered species and/or their habitats (including those proposed for listing) and the justification as to why the issuance of this variance does not jeopardize their continued existence and/or the existence of their habitat. (Appendix C details the application process) Therefore, it is not anticipated that the granting of this variance to qualifying applicants will jeopardize threatened or endangered species or result in the destruction or adverse modification of such species' critical habitat.

1. Great Lakes - Upper Mississippi River Board of State and Provincial Public Health and Environmental Mangers, Recommended Standards for Wastewater Facilities, Policies for the Design, Review, and Approval of Plans and Specifications for Wastewater Collection and Treatment Facilities, 2014 Edition.  
<http://10statesstandards.com/wastewaterstandards.pdf>

# APPENDICES

### **Highest Attainable Demonstration for a Wastewater Lagoon**

Wastewater lagoons are an important wastewater treatment technology in terms of cost effectiveness and operational viability. Multi-celled, facultative lagoon systems that are properly designed, operated, and maintained can be protective of water quality where instream assimilative capacity exists. The intent of this framework is to establish HACs for ammonia to support the multiple-discharge variance request for economically distressed communities that will experience a substantial and widespread economic and social burden with respect to costs associated with compliance of total ammonia nitrogen water quality standards. Neglected lagoon systems can pose a threat to surface water; therefore, it is imperative that the facility must meet the requirements as a well-functioning lagoon system before a variance from WQS can be considered. The HACs are established to maintain and protect the highest attainable water quality. The Department has determined to implement a multiple-discharger variance (MDV) per the EPA's guidance, "Flexibilities for States Applying EPA's Ammonia Criteria Recommendations Document found at <https://www.epa.gov/sites/production/files/2015-08/documents/flexibilities-for-states-applying-epa-s-ammonia-criteria-recommendations.pdf>.

EPA published a wastewater lagoons design and operation manual in 2011 which describes their finding of performance achievements associated with design details that might be employed for existing lagoons. EPA has stated their support for multi-celled facultative lagoon systems as a treatment option particularly for communities that could not afford to match the construction grants that were offered at that time to bring communities of all sizes some level of wastewater treatment. The Department recommends that qualifying communities are issued a permit that incorporates this variance. The highest attainable effluent conditions are to be determined by using the facility's site specific current and past five years of performance of their well-functioning lagoon system.

**Highest Attainable Determination Approach:** The Department's approach utilizes the most recent design document published by EPA in 2011, entitled "Principles for Design and Operations for Wastewater Treatment Pond Systems for Plant Operators, engineers, and managers" (EPA/600/R-11/088). EPA recognizes that well-functioning multi-celled, facultative lagoons provide reliable, low cost, and relatively low maintenance wastewater treatment for municipalities. Although the basic design of lagoons has not changed for the last 30 years, the Department has also examined some of the innovations and improvements in light of the economic considerations. This determination is not intended to address facilities that discharge to waters where wasteload allocations exist for total ammonia nitrogen.

**Definition of Well-Functioning Multi-Celled Facultative Lagoon System:** The Department will only approve applications for the multiple-discharger variance where facilities meet the standard of a well-functioning multi-celled, facultative lagoon system. Therefore, it is imperative that a well-functioning lagoon system is clearly defined within this MDV framework. A multi-celled lagoon is defined as a lagoon system with two or more cells.

Well-Functioning Lagoon System must:

- be designed to have no more than 25 percent loss of its design detention time as guidance suggests in the 10 States Standards<sup>1</sup>;
- meet equivalent to secondary treatment technology based effluent limits for conventional pollutants;
- not show signs of going septic or currently be septic;
- not show signs of significant scum or solids floating on the surface;
- not emit foul odors; and
- show no objectionable weeds, in or around the lagoon pond.

**Lagoon Enhancement Options:** There are a number of emerging technologies for retrofitting lagoon systems to address ammonia. These systems involve various ways of adding oxygen, increasing biomass, covering to retain heat, and using various configurations and equipment to provide areas within the lagoon for fixed film growth. Several of these systems are being piloted in Missouri. However, all of these technologies are associated with considerable expense. For the universe of smaller lagoon systems that are being addressed by the MDV, wastewater irrigation systems have proven to be less expensive than these enhanced options. The Department expects the technology of lagoon enhancements will continue to evolve, but at this time the Department is not aware of any that will reliably meet water-quality based ammonia limits that are affordable.

**Conclusion:** In conclusion, the Department recommends highest attainable effluent conditions for a well-functioning lagoon in Missouri be based on the 95<sup>th</sup> and 99<sup>th</sup> percentile of the facility's past 5 years of discharge monitoring reports. The DMR data will be compiled and organized by seasons. The permit will be issued with final highest attainable effluent conditions based on the 95<sup>th</sup> percentile as the Average Monthly Load (AML) and the 99<sup>th</sup> percentile as the Maximum Daily Load (MDL) or the WQBEL during a season and/or MDL or AML where the WQBEL can be met. In some cases, a well-functioning lagoon system will not need a variance of WQS for both seasons and/or both the AML and MDL. In this case, the highest attainable effluent condition will be the WQBEL for the times in which the lagoon can meet the WQBEL.

#### **References:**

1. Great Lakes - Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, Recommended Standards for Wastewater Facilities, Policies for the Design, Review, and Approval of Plans and Specifications for Wastewater Collection and Treatment Facilities, 2014 Edition. <http://10statesstandards.com/wastewaterstandards.pdf>

## **Pollution Minimization Plan**

**Background and Overview:** A PMP is required by 40 CFR§131.14 for any water quality standards variance when no additional feasible pollutant control technology can be identified and the highest attainable effluent condition is adopted by the State as the water quality standard. A PMP is defined in 40 CFR§131.3(p) as a structured set of activities to improve processes and pollutant controls that will prevent and reduce pollutant loadings. During the term of the variance, the PMP is a requirement of the MDV and each municipality issued a permit under the terms and conditions of the MDV is required to meet all obligations of the PMP.

The goal of the PMP is to maintain effluent concentrations of total ammonia nitrogen.

**Requirements:** The permit holder must maintain the following while under the term of the MDV:

- a. The facility shall meet the standard of a well-functioning lagoon system;
- b. A certified operator must be maintained;
- c. The facility shall be well maintained;
- d. The facility shall meet equivalent to secondary treatment requirements;
- e. The facility must meet the highest attainable effluent conditions reflected as final effluent limits within their permit;
- f. The permit holder shall not accept new industrial waste containing significant ammonia concentrations as influent to the facility;
- g. The lagoon must be designed to have no more than 25 percent loss of its design detention time as guidance recommends in the 10 States Standards<sup>1</sup>;
- h. The permit holder shall measure sludge depth and report the depth to the Department during the variance application process and with each subsequent permit renewal application;
- i. The permit holder shall actively engage with the Department when compliance assistance is needed;
- j. The permit holder is to report any improved processes and controls that have been or will be implemented to prevent and reduce pollutant loadings using the PMP Annual Report Form;
- k. The permit holder must provide the Department with adequate financial documentation during the application process and permit renewals so that the Department can make an informed decision on whether or not the community would endure a substantial and widespread social and economic impact as a result of meeting the WQS of total ammonia nitrogen; and
- l. The permit holder must provide the Department with assurance that no threatened or endangered species and/or their habitats are adversely affected as a result of this variance. (see Appendix C)

**Reporting and Progress:** Annual PMP reports are due to the regional office by December 31 of each year. The annual report must be completed and submitted using the form provided by the Department and included with the renewed permit. Department staff will meet with the MDV recipient each year to ensure the permit holder completes the PMP report form accurately and has met and will continue to meet the requirements of the PMP. Department staff will offer support and assistance to the community during the term of the variance.

1. Great Lakes - Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, Recommended Standards for Wastewater Facilities, Policies for the Design, Review, and Approval of Plans and Specifications for Wastewater Collection and Treatment Facilities, 2014 Edition. <http://10statesstandards.com/wastewaterstandards.pdf>

### **Group 1 Violations**

**Background:** Group 1 Violations are the most serious and significant impacts or threats to human health and the environment. For these violations, required actions for mitigation of immediate impacts to human health or the environment are determined by the onsite staff in coordination with supervisory staff. Group 1 Violations are defined in the Department's PACE manual, last revised in January of 2017.

**Group 1 Violations:** The following Group 1 Violations will lead to immediate dismissal from the MDV and a direct referral for Water Protection Program Enforcement Action.

- Intentional/or grossly negligent act of dumping/discharging waste into waters of the state that results in harm to human health or the environment (likely criminal act) or placing a water contaminant in location where it poses an imminent threat to public health or the environment.
- Discharge that results in fish kill (or other aquatic life) or has significant environmental or health impacts
- Discharge that results in serious and significant impacts from specific or general Water Quality Standard violations
- Municipal Pretreatment Violations
  - Failure to enforce against pass through and/or interference
  - Failure to submit required reports within 30 days
  - Failure to meet compliance schedule milestone date within 90 days

### **Multiple Discharger Variance Engineering Field Evaluation**

**Purpose:** An engineering field evaluation will be completed by Department engineers on each facility that has an application for a MDV to determine if the facility meets the requirements of a well-functioning, multi-celled facultative lagoon system. An example of the field evaluation form is shown below. If the lagoon system does not meet the requirements of the well-functioning multi-celled, facultative lagoon system, the permit holder will not qualify for the MDV at this time.

#### **Example of the Field Evaluation Format (2017):**

**Facility Name:** \_\_\_\_\_

**MO#:** \_\_\_\_\_

**Cost Analysis for Compliance rating:** \_\_\_\_

**Design Flow:** \_\_\_\_\_

**Actual Flow:** \_\_\_\_\_ **Peak Flow:** \_\_\_\_\_

**Required acreage for Wastewater Irrigation:** \_\_\_\_\_

**Lagoon Type:** ☐ Aerated ☐ Unaerated

**No. of Earthen Cells:** ☐ 2 ☐ 3 ☐ More: \_\_\_\_\_ **No. of Baffles:** \_\_\_\_\_

**Lagoon Dimensions at Top of Berm:** Cell 1 \_\_\_\_\_ Cell 2 \_\_\_\_\_ Cell 3 \_\_\_\_\_

**Lagoon Depths (average):** Cell 1 \_\_\_\_\_ Cell 2 \_\_\_\_\_ Cell 3 \_\_\_\_\_

☐ From Water level ☐ From top of Berm

**Freeboard:** \_\_\_\_\_ ft. **Berm Slope:** \_\_\_\_:1 **Width of Berm:** \_\_\_\_ ft.

**Are sludge blanket levels measured in each cell:** ☐ Yes ☐ No  
(Sludge levels must be provided by the facility)

**Sludge Depths:** Cell 1 \_\_\_\_\_ Cell 2 \_\_\_\_\_ Cell 3 \_\_\_\_\_

If no, date last sludge depth study was performed: \_\_\_\_\_

**Percentage (%) of Detention Time Loss** \_\_\_\_\_

**Continuous Discharge:** ☐ Yes ☐ No If no, explain

**Are any industries discharging to the facility:** ☐ Yes ☐ No

**Grass maintained properly:** ☐ Yes ☐ No

**Berms maintained properly:** ☐ Yes ☐ No

**Fence maintained properly:** ☐ Yes ☐ No



Appendix B – Field Engineer Evaluation

**Problems noted:** ☐Vegetation in the lagoon or dikes ☐Rodent burrowing ☐Erosion ☐Sludge

**Appearance of effluent:** Color: \_\_\_\_\_ Odor: \_\_\_\_\_ Particles: \_\_\_\_\_  
☐ Good ☐ Fair ☐ Poor

**General Overall Condition of the lagoon:** ☐Good ☐Fair ☐Poor

**Overall comments:**

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**Recommendation/Conclusion:**

- ☐ The lagoon meets the requirements of the MDV as a “well-functioning lagoon system”
- ☐ The lagoon does not meet the requirements of the MDV as a “well-functioning lagoon system”

**Explain the recommendation:**

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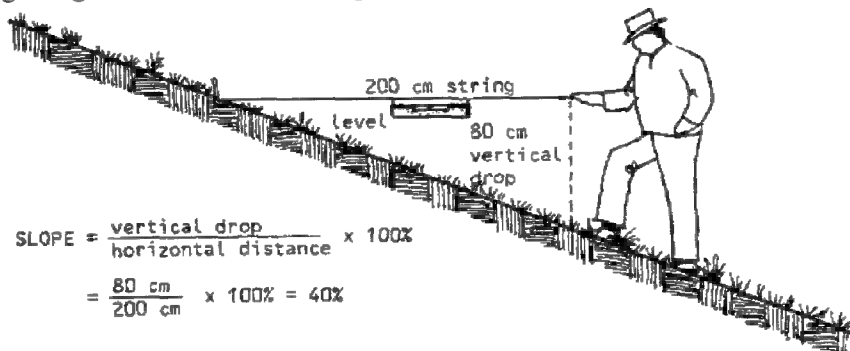
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**Staff name:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**FIELD NOTES:**

**References:** Calculate Side Slope.

The slope of the berm should be measured on the inside and outside of the lagoon on all four sides. The Missouri design guides state that inner and outer dike slopes shall not be steeper than 3:1 (3 feet horizontally for every 1 foot vertical change) with the inner slopes no flatter than 4:1. The slope of the berm can be calculated by measuring the horizontal distance with a level tape measure and the vertical drop measured at a right angle as shown in the example below.



The vertical drop can be fixed to 1 foot and the horizontal distance from the 1 foot vertical drop to the berm can be measured at a right angle to determine the slope. The slope can also be determined using the calculation below:



If it is assumed  $X = 3\text{ft}$  and  $Y = 1\text{ft}$  an angle of  $18.43^\circ$  is determined. Therefore, any angle steeper than  $18.43^\circ$  does not comply with the Missouri design guides.

$$\tan^{-1}\left(\frac{1}{3}\right) = \theta = 18.43^\circ$$

Angle	Slope
$26.57^\circ$	2:1
$18.43^\circ$	3:1
$14.04^\circ$	4:1

### **Multiple-Discharger Variance Application Process**

**MDV Application Process:** The application process contains several steps to ensure the Department has thoroughly vetted the applicant before granting of the variance.

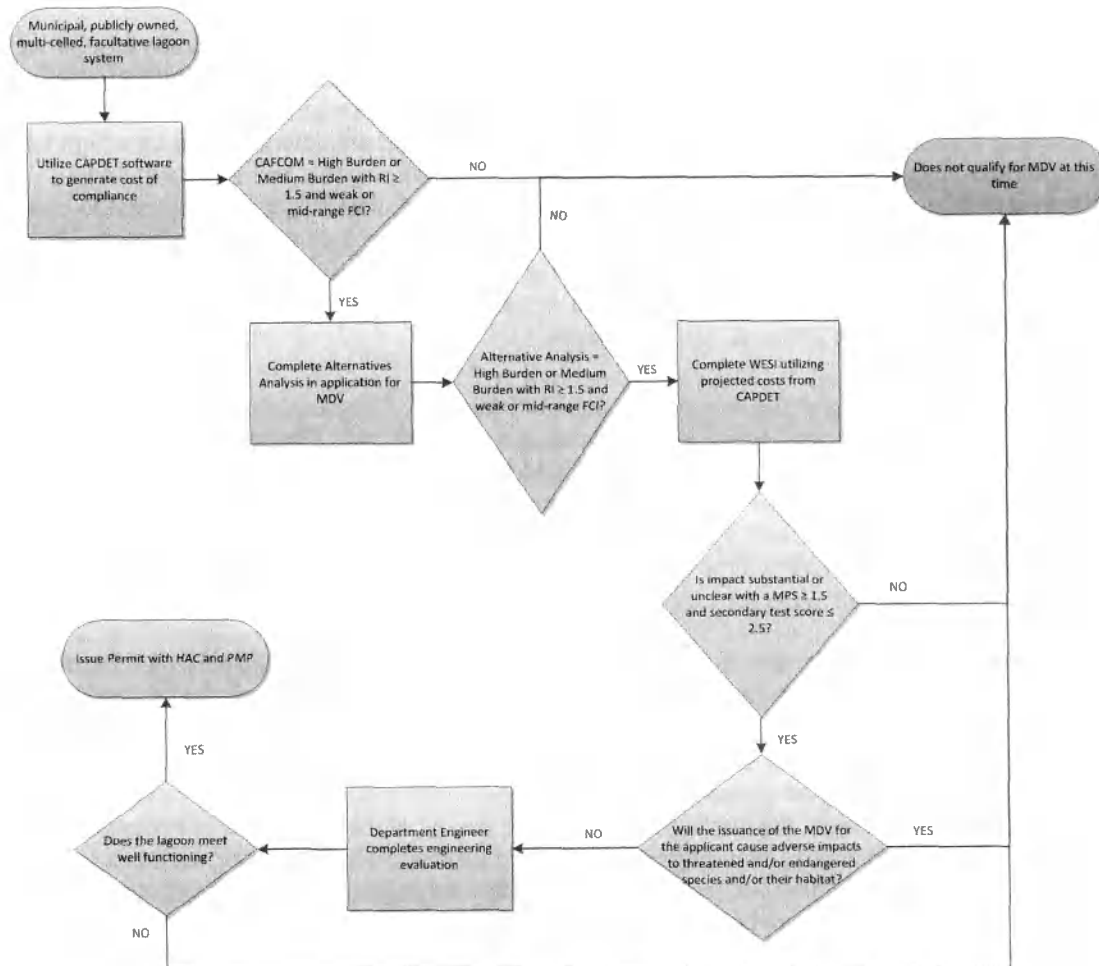
1. Department staff determine if the facility is a minor, municipal, publicly owned multi-celled, facultative lagoon system. If yes, Department staff will complete step 2 of the MDV application process.
2. Department staff will complete the CAFCom to evaluate if upgrading the facility is determined to cause a high financial burden or a medium financial burden with a residential indicator of greater than or equal to 1.5 percent and a financial capability indicator determined as weak or mid-range. If yes, then the results are considered to cause a substantial impact and the Department will contact the permit holder to assist them with the completion of the MDV application process. Move to step 3.
3. Department staff will assist the permit holder (applicant) in the completion of the alternatives analysis. The alternatives analysis estimates the cost of the following alternatives for the applicant to meet compliance with the WQS for total ammonia nitrogen: regionalization, convert to on-site septic systems, and relocate the point of discharge to a Class P stream that would account for an appropriate mixing zone. Utilizing the Department's financial capability matrix, the projected user rate for each of the three alternative options is analyzed using the Department's Financial Capability Matrix provided with the CAFCom. If all alternatives are determined to be a high burden or a medium burden with a residential indicator of greater than or equal to 1.5 percent and a financial capability indicator determined as weak or mid-range, then they are considered to cause a substantial financial burden if required to implement. Department staff will continue to assist the applicant with the application. If one or more of the alternatives are feasible, then the MDV will be denied at this time and the applicant is urged to proceed with working toward compliance with the WQS for total ammonia nitrogen. Move to step 4.
4. Department staff will assist the applicant to complete the EPA's financial screener spreadsheet titled, "Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts (WESI)." If the result from the analysis determine substantial financial impacts are likely to be substantial or impact in unclear with a MPS score of greater than or equal to 1.5 and a secondary test score less than or equal to 2.5, then staff will continue to assist the applicant with their application. If not, the MDV will be denied and the applicant is urged to proceed with working toward compliance with WQS for total ammonia nitrogen. Move to step 5.
5. Department staff will work with the permit holder to submit an inquiry to the Missouri Department of Conservation in order to show that the MDV will not cause an adverse impact to federally-listed and/or state-listed threatened or endangered species (designated or proposed) or their critical habitat that are known to be present at the point of discharge. If results indicate that a federally-listed and/or state listed threatened or endangered species and/ or their critical habitat are currently at or near the point of discharge, the applicant is to provide the list of the threatened or endangered species and/or their habitats (including those proposed for listing) and the justification as to why the issuance of this variance does not jeopardize their continued existence and/or the existence of their habitat. If no justifications can be provided, the MDV will be denied at this time. The applicant is urged to proceed with working toward compliance with WQS for total ammonia nitrogen. If the results show that there are no threatened and/or endangered species and/or their habitat at the point of

## Appendix C – Multiple - Discharger Variance Application

discharge or adequate justification was provided with the application, the application will proceed and the Department will complete an engineering evaluation. Move to step 6.

6. Department engineers will conduct an engineering field evaluation to ensure the lagoon meets the definition of a well-functioning lagoon system. An example of the engineering field evaluation can be found in Appendix B. The engineering field evaluation will determine whether or not the lagoon system meets the requirements of a well-functioning, multi-celled, facultative lagoon. If the lagoon meets the requirements of a well-functioning lagoon, the MDV application will be approved and the permit will be issued with HAC as final effluent limits for total ammonia nitrogen with the requirement of the PMP. Public notice of the Missouri State Operating permit is provided in accordance with the state Clean Water Law, Chapter 644, RSMo, 10 CSR 20-6.010, and the federal Clean Water Act. If the lagoon does not meet the requirements of a well-functioning lagoon system, the applicant does not qualify for the MDV at this time. However, the Department will work with the community to determine the most practical option to meet compliance with WQS.

**Figure C-1: Multiple Discharger Variance Application Process Map**



# Appendix C – Multiple - Discharger Variance Application



## MISSOURI DEPARTMENT OF NATURAL RESOURCES WATER PROTECTION PROGRAM MULTIPLE-DISCHARGER VARIANCE APPLICATION

<b>GENERAL INFORMATION</b>	
FACILITY NAME	PERMIT NUMBER (s) #MO-
MAILING ADDRESS	COUNTY
<b>2. GENERAL INFORMATION</b>	
2.1 Is this facility a Municipal Publicly Owned Treatment Works? <input type="checkbox"/> Yes <input type="checkbox"/> No <i>If No, this facility does not qualify for the multiple-discharger variance. If necessary, please apply for a site-specific variance.</i>	
2.2 Population served:	
2.3 Design Flow in gallons per day:	
2.4 Actual Flow in gallons per day:	
2.5 Wastewater Treatment Facility Type: <i>To qualify for the multiple-discharger variance, the current treatment type must fit one of the listed categories.</i>	<input type="checkbox"/> Lagoon: <input type="checkbox"/> Single Cell (not eligible for Multiple Discharger Variance) <input type="checkbox"/> Multi-Cell, # of cells _____
2.6 Age(s) of current Wastewater Treatment Facility Infrastructure(s):	
2.7 Receiving Stream at the point of discharge from the wastewater treatment facility:	
2.8 Does your municipality currently own land adjacent to your lagoon? <i>If yes, how many acres?</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No _____ acres
2.9 Please attach a statement describing the economic and social conditions of your community. (e.g. condition of schools, city buildings, presence of grocery stores, and any other relevant information. Can include visual aids when appropriate)	<input type="checkbox"/> Attached
<b>3. CURRENT NPDES PERMIT INFORMATION</b>	
3.1 Does your municipality currently have an application for renewal of your NPDES permit submitted to the Department of Natural Resources? <i>(If No, please submit an application for renewal 180 days before the expiration date of your current permit, along with the completed financial questionnaire and this multiple-discharger variance applicant questionnaire)</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No
3.2 Does your site-specific NPDES permit currently contain final effluent limits for Ammonia as N? If yes, how many more years of the schedule of compliance are left on your current NPDES permit? <i>(If Yes, answer 3.3, If No, skip to 4.1)</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No # of years left on SOC: _____
3.3 Is the municipality currently working toward meeting the NPDES permitted schedule of compliance to comply with the final effluent requirements for Ammonia as N? <i>(If Yes, please attach a document that includes the steps taken to meet these requirements)</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No

## Appendix C – Multiple - Discharger Variance Application

<b>4. FINANCIAL INFORMATION</b>	
<p>4.1 Please complete and submit the EPA spreadsheet; <u>Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities</u>. Does the Substantial Impacts Matrix indicate the pollution control options are likely to impose a substantial and economic and social impact on the residents of the municipality? Projected cost information from the most recent draft of the CAFCom/Affordability Analysis can be used to complete this form.</p> <p><i>EPA spreadsheet can be found at:</i>  <a href="http://water.epa.gov/scitech/swguidance/standards/economics/upload/usespublic.xlsx">http://water.epa.gov/scitech/swguidance/standards/economics/upload/usespublic.xlsx</a></p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>
<b>5. Threatened or Endangered Species</b>	
<p>5.1 Provide an attached list of all federally and state-listed threatened or endangered species (designated or proposed) and/or the critical habitats of those species (designated or proposed) that are known to occur on or near the site of discharge. (Please see Fact Sheet below titled; <u>Natural Heritage Review Report</u>. Attach additional sheets as necessary and include the response letter from the Missouri Department of Conservation)</p> <p><input type="checkbox"/> Attached</p>	
<p>5.2 Provide justification about how the multiple-discharger variance will not cause an impact to the federally-listed and/or stated-listed threatened or endangered species (designated or proposed) or their critical habitat that are known to be present at the point of discharge for your facility. (Please see Fact Sheet below titled; <u>Natural Heritage Review Report</u>. Attach additional sheets as necessary and include the response letter from the Missouri Department of Conservation)</p> <p><input type="checkbox"/> Attached <input type="checkbox"/> N/A</p>	
<b>6. Alternative Effluent Control Analysis</b>	
<p>6.1 Provide an attached analysis of the alternative effluent controls examined, including but not limited to; discharge relocation alternative, wastewater irrigation or decentralization of the utility (or other no discharge options), and regionalization of the utility. (Please see Fact Sheet below titled; <u>Reasonable Alternatives Analysis</u>. Please include an aerial map outlining the current location of the outfall, the potential wastewater treatment facility (WWTF) effluent line, the potential WWTF discharge location and the mileage of line)</p> <p><input type="checkbox"/> Attached</p>	
<b>7. Lagoon Design Profile</b>	
<p>7.1 Please refer to Attachment A. Complete Attachment A and submit with the completed application.</p> <p><input type="checkbox"/> Attached</p>	
<b>8. CERTIFICATION</b>	
FACILITY CONTACT	OFFICIAL TITLE
EMAIL ADDRESS	TELEPHONE NUMBER WITH AREA CODE
<p>I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.</p>	
OWNER OR AUTHORIZED REPRESENTATIVE	OFFICIAL TITLE
SIGNATURE	DATE SIGNED

### **MULTIPLE-DISCHARGER VARIANCE APPLICATION**

1. Application form is complete.
2. \$250.00 filing fee paid.
3. Attach statement describing social and economic conditions. (2.9)
4. Submit the EPA spreadsheet; Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts: Public Sector Entities. (4.2)
5. Submit the Natural Heritage Review Report from Missouri Department of Conservation (5)
6. Submit the Alternatives Analysis (6)
7. Submit Completed Attachment A found below (7)
8. This completed form and any attachments should be submitted electronically and by mail to:

Department of Natural Resources  
Water Protection Program  
ATTN: MDV Contact  
P.O. Box 176  
Jefferson City, MO 65102  
[lacey.hirschvogel@dnr.mo.gov](mailto:lacey.hirschvogel@dnr.mo.gov)

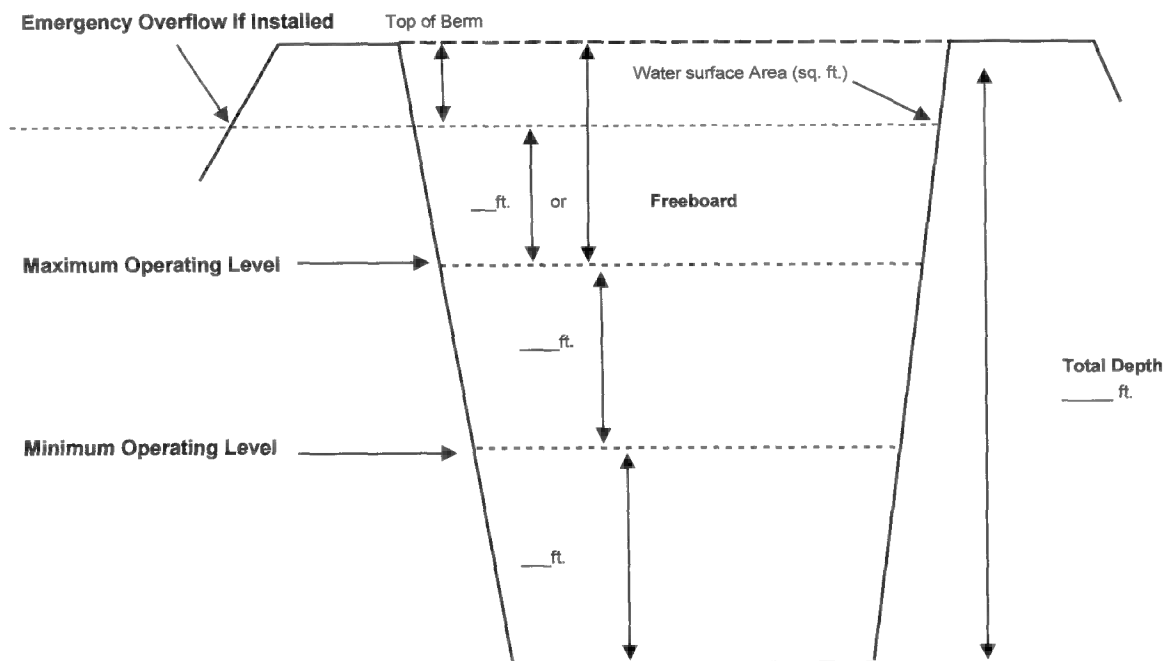
For additional guidance, see the following:

- [https://www.law.cornell.edu/cfr/text/40/131.14?qt-cfr\\_tabs=1#qt-cfr\\_tabs](https://www.law.cornell.edu/cfr/text/40/131.14?qt-cfr_tabs=1#qt-cfr_tabs)
- <http://water.epa.gov/scitech/swguidance/standards/upload/Discharger-specific-Variances-on-a-Broader-Scale-Developing-Credible-Rationales-for-Variances-that-Apply-to-Multiple-Dischargers-Frequently-Asked-Questions.pdf>
- [http://water.epa.gov/learn/training/standardsacademy/upload/2007\\_11\\_15\\_standards\\_academy\\_basic\\_course\\_15-variances-11-15-07.pdf](http://water.epa.gov/learn/training/standardsacademy/upload/2007_11_15_standards_academy_basic_course_15-variances-11-15-07.pdf)
- [http://www.werf.org/i/c/DecentralizedCost/Decentralized\\_Cost.aspx](http://www.werf.org/i/c/DecentralizedCost/Decentralized_Cost.aspx)
- For assistance in completing this form or the EPA form, please contact [WPSC.MultidischargerVariance@dnr.mo.gov](mailto:WPSC.MultidischargerVariance@dnr.mo.gov)
- For more information, contact the Department's Water Protection Program at 573-751-1300.

**ATTACHMENT A**

(To be included with the application)

Lagoon Design Profile\*



**DEFINITION OF TERMS (REFER TO THE PROFILE SKETCH ABOVE).**

- A. Freeboard is depth from the water level to the point on the lagoon where a discharge from the cell would occur. This could be a constructed emergency spill way or the lowest point of the lagoon berm;
- B. Maximum Operating Level is at the top of outlet pipe or maximum weir setting.
- C. Minimum Operating Level is at the lowest outlet pipe or weir setting.
- D. Total Depth is from top of berm to bottom of basin berm to the bottom elevation.

\* If the facility utilizes multiple cells, a separate lagoon design profile must be completed for each cell.



## **ALTERNATIVES ANALYSIS**

Each municipality must consider all viable treatment options available to meet water quality standards for total ammonia nitrogen. The CAFCom provided the estimated costs for a site specific wastewater lagoon to upgrade to a wastewater irrigation system and/or a mechanical treatment plant based on the design flow (in some cases, if appropriate, the average flow) and the number of connections to the facility. The estimated costs provided within the analysis are the total present worth, capital cost of the project, annual cost of operation and maintenance, and the estimated resulting cost per household (all definitions are provided below). Each CAFCom uses software to estimate the cost for reconstruction of the treatment plant titled CapDet. CapDet estimates the complete reconstruction of the following treatment types depending on flow:

- Wastewater Irrigation system – up to 150,000 gpd
- Extended Aeration basin – up to 10 million gallons per day (MGD)
- Sequencing Batch Reactor – flow range of 20,000 gpd to 10 MGD
- Oxidation Ditch – flow range of 20,000 gpd to 10 MGD
- Extended Aeration Package Plant – up to 50,000 gpd

All treatment technologies listed above are capable of meeting total ammonia nitrogen effluent limits of a 0.6 mg/L monthly average in the summer season and a 2.1 mg/L monthly average in the winter season. Based on the CAFCom, the Department has determined that the construction, installation and operation and maintenance of each of the treatment technologies listed above would cause a substantial and widespread economic and social impact for the residents of the municipality.

The alternatives analysis found below must be completed as part of the application process. The alternatives listed below are; regional treatment, discharge relocation, and decentralization. Each municipality should use the estimated costs provided by the Department that most closely resemble how each alternative would be achieved for their site specific facility. Each applicant can then determine if one or more of the treatment scenarios below are reasonable alternatives in order to achieve water quality standards for total ammonia nitrogen.

## **REGIONAL TREATMENT**

Regional treatment is considered a reasonable alternative if the authority receiving the wastewater has adequate surplus treatment capacity available to receive the additional wastewater while remaining within its current permitted design capacities for both flow and loading. That is, the wastewater addition occurs within the design capacity of the receiving treatment plant and a separate antidegradation review is not required. However, this option may or may not be an economically feasible option for your community. If this alternative treatment is not an option for your community, please include a statement based on one of the statements provided below when submitting your application for the multiple-discharger variance.

**Choose the estimated costs closest to your situation from the spreadsheet below and include in the statement below. Please include a statement attached to your application based on one of the statements provided below:**

**If under 10 miles:**

The city of (insert closest City or regional treatment facility with a facility capable of receiving your design flow)'s treatment plant is the nearest facility that would be capable of accepting (insert your municipal name here) wastewater. The total present worth for the construction and operation of pipes, manholes, pump stations and effluent forcemain to pump the community's entire wastewater flow were estimated to be (insert present worth costs based on the matrix found below, \$X.XX) to pump WWTF effluent to (insert closest City with a facility capable of receiving your design flow). The total present worth costs assume a five percent interest rate over a 20 year term of loan and include the capital cost plus the annual operation and maintenance cost. To implement this alternative, the wastewater from (insert your municipal name here) would have to be pumped approximately (insert number of miles here) miles. The higher cost of this alternative is primarily due to the lengthy force main and associated pumping costs that would be required. The estimated cost per user per month for this alternative is (See example below and calculate the user cost and insert here, \$X.XX). The estimated residential user cost as a percent of the median household income (MHI) is calculated to be (See example below and calculate the percentage and insert here, X.X%). According to EPA's financial capability assessment guidance, "Combined Sewer Overflows: Guidance for Financial Capability Assessment and Schedule Development," a residential user cost as a percent of MHI of over two percent will result in a "high financial impact." Therefore, regionalization is not a feasible alternative for the (insert municipal name here) at this time. The inclusion of easement costs were not included in the estimated costs, however it is known the cost of easements can substantially raise the capital cost for the project. The estimates provided by the Department anticipate the costs incurred from this alternative would result in a substantial and widespread economic and social impact for the residents of our community.

**If over 10 miles:**

The City of or Regional Treatment (insert closest City or regional treatment facility capable of receiving your design flow)'s treatment plant is the nearest facility that would be capable of accepting the (insert your municipal name here)'s wastewater. To implement this alternative, the wastewater from (insert your municipal name here) would have to be pumped approximately (insert number of miles here) miles. The Department has determined the total present worth associated with pipes, manholes, pump stations and effluent forcemain to pump the community's entire wastewater flow to a location farther than ten miles is a cost that will result in substantial and widespread economic and social impact. Regionalization of the wastewater treatment facility is not a feasible alternative at this time.

## **DISCHARGE RELOCATION**

A discharge relocation alternative should be considered by communities facing costly treatment upgrades. The alternative receiving stream will need to be a class P (river) stream or a lake in order to receive higher effluent limits for Ammonia as N. If this alternative is not an option for your community, please include a statement based on one of the statements provided below when submitting your application for the multiple-discharger variance.

**Choose the estimated costs closest to your situation from the spreadsheet below and include in the statement below. Please include a statement attached to your application based on one of the statements provided below:**

### **If under 10 miles:**

The provided map outlines a potential routing strategy for the *(your facility's wastewater treatment facility name here)* alternate discharge location. This proposed alternative would convey WWTF effluent *(miles of necessary pipe)* miles to the *(new receiving stream)* through the addition of a new pipes, manholes, pump station(s) and effluent forcemain. A 10 percent contingency cost has been assumed for this project. However, due to the high level planning of this alternative and the potential unknown impacts regarding the proposed general alignment of the force main, the Department has observed contingency costs up to 30 percent as appropriate for this project. The Department has provided an estimate for the total present worth of this project to be *(insert present worth based on the matrix found below, \$X.XX)*. The total present worth costs assume a 5 percent interest rate, 20-year term of loan, and includes capital costs plus annual costs for operation and maintenance. In order for *(insert municipal name here)* to pipe Wastewater Treatment Facility (WWTF) effluent to the closest alternative stream it could cost up to *(See user rate equation below and calculate the user cost and insert here, \$X.XX)* per residential user per month. The estimated residential user cost as a percent of the median household income (MHI) is calculated to be *(See user rate as a % of MHI equation below and calculate the percentage and insert here, X.X%)*. According to EPA's financial capability assessment guidance, "Combined Sewer Overflows: Guidance for Financial Capability Assessment and Schedule Development," a residential user cost as a percent of MHI of over two percent will result in a "high financial impact." Therefore, the relocation of the receiving stream is not a feasible alternative for the *(insert municipal name here)* at this time. The inclusion of easement costs were not included in the estimated costs; however, it is known the cost of easements can substantially raise the capital cost for the project. Based on the cost estimates provided by the Department, the anticipated project costs would result in a substantial and widespread economic and social impact for our community.

### **If over 10 miles:**

The provided map outlines a potential routing strategy for the *(your facility's wastewater treatment facility name here)* alternate discharge location. This proposed alternative would convey WWTF effluent *(miles of necessary pipe)* miles to the *(new receiving stream)* through the addition of a new pipes, manholes, pump station(s) and effluent forcemain. The Department has determined the total present worth associated with pipes, manholes, pump stations and effluent forcemain to pump the community's entire wastewater flow to a location farther than ten miles is a cost that will result in substantial and widespread economic and social impact. An alternate discharge location of the wastewater treatment facility is not a feasible alternative at this time.

## **Calculations and References:**

**Estimated Present Worth Cost Matrix:** to use as the cost estimate in the statements above. Chose the flow closest to your facilities design flow (flow is listed as gallons per day) and pair with the distance (listed in miles). Please round up to the nearest design flow for the most accurate cost estimate. If your distance is greater than 10 miles it is assumed the projected cost associated with regionalization and/or diverting effluent to an alternative receiving stream will result in a substantial and widespread economic and social impact.

**Matrix D-1: Estimated Present Worth Cost Matrix**

Flow (mgd)	Distance (miles)										
	0.5	1	2	3	4	5	6	7	8	9	10
0.01	\$405,141	\$543,618	\$919,871	\$1,029,460	\$1,641,143	\$1,918,096	\$2,195,050	\$2,472,003	\$2,748,957	\$3,025,910	\$3,302,863
0.02	\$420,385	\$558,861	\$1,117,722	\$1,394,676	\$1,671,629	\$1,948,583	\$2,225,536	\$2,502,489	\$2,779,443	\$3,056,396	\$3,333,350
0.03	\$830,934	\$1,075,011	\$1,563,164	\$2,051,318	\$2,539,471	\$3,027,625	\$3,515,778	\$4,003,931	\$4,492,085	\$4,980,238	\$5,468,392
0.04	\$845,963	\$1,090,040	\$1,578,194	\$2,066,347	\$2,554,500	\$3,042,654	\$3,530,807	\$4,018,961	\$4,507,114	\$4,995,267	\$5,483,421
0.05	\$857,952	\$1,102,029	\$1,590,182	\$2,078,335	\$2,566,489	\$3,054,642	\$3,542,796	\$4,030,949	\$4,519,102	\$5,007,256	\$5,495,409
0.06	\$868,694	\$1,112,771	\$1,600,924	\$2,089,078	\$2,577,231	\$3,065,384	\$3,553,538	\$4,041,691	\$4,529,845	\$5,017,998	\$5,506,151
0.07	\$880,689	\$1,124,765	\$1,612,919	\$2,101,072	\$2,589,226	\$3,077,379	\$3,565,532	\$4,053,686	\$4,541,839	\$5,029,993	\$5,518,146
0.08	\$891,088	\$1,135,165	\$1,623,318	\$2,111,472	\$2,599,625	\$3,087,778	\$3,575,932	\$4,064,085	\$4,552,239	\$5,040,392	\$5,528,545
0.09	\$899,512	\$1,143,589	\$1,631,742	\$2,119,896	\$2,608,049	\$3,096,203	\$3,584,356	\$4,072,509	\$4,560,663	\$5,048,816	\$5,536,970
0.1	\$906,940	\$1,151,016	\$1,639,170	\$2,127,323	\$2,615,477	\$3,103,630	\$3,591,783	\$4,079,937	\$4,568,090	\$5,056,244	\$5,544,397
0.11	\$913,918	\$1,157,995	\$1,646,149	\$2,134,302	\$2,622,455	\$3,110,609	\$3,598,762	\$4,086,916	\$4,575,069	\$5,063,222	\$5,551,376
0.12	\$922,897	\$1,166,974	\$1,655,127	\$2,143,281	\$2,631,434	\$3,119,587	\$3,607,741	\$4,095,894	\$4,584,048	\$5,072,201	\$5,560,354
0.13	\$929,627	\$1,173,703	\$1,661,857	\$2,150,010	\$2,638,164	\$3,126,317	\$3,614,470	\$4,102,624	\$4,590,777	\$5,078,931	\$5,567,084
0.14	\$971,086	\$1,215,162	\$1,703,316	\$2,191,469	\$2,679,622	\$3,167,776	\$3,655,929	\$4,144,083	\$4,632,236	\$5,120,389	\$5,608,543
0.15	\$977,317	\$1,221,393	\$1,709,547	\$2,197,700	\$2,685,853	\$3,174,007	\$3,662,160	\$4,150,314	\$4,638,467	\$5,126,620	\$5,614,774

**User Rate Equation:** to use as the cost estimate in the statements above.

**Estimated monthly residential user rate** = Present Worth / 20 years / 12 months / number of active connections to WWTF

Note: The number of connections is specific to your community and can be found on the Cost Analysis for Compliance written by the Department based on information provided by the community.

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**User rate as a percent of MHI Equation:** to be used as the cost estimate in the statements above.

**Estimated monthly user rate as a percent of MHI** = [Estimated monthly residential user rate / (Median Household Income/12)]100

Note 1: The estimated monthly residential user rate is calculated using the user rate equation

Note 2: The Median Household Income is specific to your community and can be found on the Cost Analysis for Compliance written by the Department.

**Assumptions made by the Department to calculate the estimated costs:**

- Construction Labor \$32 per hour
- Operator \$25 per hour
- 15 manholes per miles of pipe
- \$2.50 per foot for cleaning/maintenance (annual inspection for complete line)
- 10-year pump replacement
- 1 pump station for 0.01 and 0.02 flows, everything else 2 pump stations
- \$60 for 8 inch pipe (installation)
- \$20 for 6 inch pipe (used for 0.01 and 0.02 flows)
- 5percent interest, 20 years
- 1 year construction period
- 0 percent profit
- 10 percent design fee
- 10 percent contingency

## **DECENTRALIZATION/ ON-SITE SYSTEMS**

This section examines the approximate cost of subsurface soil dispersal (absorption) systems for a small community's domestic wastewater system. This is not intended to be an all-inclusive evaluation of the cost of these systems in the State of Missouri nor does the Department endorse one type of dispersal system over another.

The primary costs discussed within this section were gathered from the Water Environment Research Foundation (WERF) Fact Sheets (D1, D2 & D3) for Decentralized Wastewater Systems, Performance & Cost of Decentralized Unit Processes, Dispersal Series. Copies of those Fact Sheets can be found at: [http://www.werf.org/i/c/DecentralizedCost/Decentralized\\_Cost.aspx](http://www.werf.org/i/c/DecentralizedCost/Decentralized_Cost.aspx). Costs given in the WERF Fact Sheets reflect 2009 estimate dollars. The Cost Estimation Tool developed by WERF was not used as part of the cost estimations shown below; however, the tool listed above can be used to calculate what the primary estimated cost to decentralize the sewer utility for your specific community. The following documentation provides several examples of the estimated cost to install a variety of systems including; individual onsite wastewater treatment systems, large scale subsurface soil dispersal systems, as well as the cost of cluster with individual onsite wastewater treatment systems.

**Estimated Cost of Land (By Region):** In some cases, the municipality will be required to acquire land in order to decentralize the current sewer utility. Unfortunately, while the Cost Estimation Tool can aid in calculating the rough amount of land required for the soil treatment it was not developed to estimate the cost of the land. Once the amount of soil treatment area is determined the approximate cost of the land can be calculated using the estimated cost of land per acre listed in the estimated cost of land per acre was determined using data published in the 2012 Census of Agriculture by the USDA.

The cost to purchase additional land could be a substantial increase to the estimated costs of the treatment alternatives listed.

**Individual Onsite Wastewater Treatment Systems (Septic):** While the use of individual onsite wastewater treatment systems (OWTS) can be considered as an option, it should be noted that a detailed thorough systematic evaluation of each lot must be conducted by a qualified individual to ensure all of the soil and site limitations are addressed in the specific design and installation. It should also be noted that because of the complexity of the soils/landscape model throughout the state, a one-size-fits-all design is not a practical solution whenever using individual onsite wastewater treatment systems within any community.

The methodology used within 10 CSR 20-6.030 Disposal of Wastewater in Residential Housing Developments for determining minimum lots size within a residential housing (subdivision) development can be used as a guide when initially investigating if OWTS are an alternative.

Please note that 10 CSR 20-6.030 (1)(D) states that, "For residential housing developments with lots less than forty thousand (40,000) square feet, (0.92 acres) only centralized sewage collection and treatment are acceptable..." In those cases where the lots are less than 0.92 acres or have limited amount of available space with suitable soils/landscapes, a centralized or cluster system should be considered.

If individual OWTS are chosen as the method of wastewater treatment, a continuing authority (responsible management entity) must be established to ensure they are a sustainable solution. Construction permits, installation and operation of the OWTS will require multiple agency cooperation to ensure the process proceeds in a timely manner. To understand what regulatory agencies may be involved

in permitting OSTs, a copy of the Department’s Fact Sheet, “Who Regulates Domestic Wastewater in Missouri?” can be found at the following link: <http://dnr.mo.gov/pubs/pub1296.pdf>.

The costs in Table 1 (below) should be used for cost estimation purposes only. As described within the WERF Fact Sheets (D1, D2 & D3) the costs are for the materials, installation and maintenance of the dispersal system only. They do not include the cost of installation, maintenance, total life cycle of the septic tanks(s), advanced treatment components or disinfection devices. Cost presumed to include 20 percent overhead and profit for contractor and there are no sales taxes on materials. Engineering fees and other professional services are not included. The actual costs can vary significantly depending upon site conditions and local economic factors. Costs given presented in the WERF Fact Sheets reflect 2009 dollars.

**Table C-1: Single Family Dispersal System Capital Cost Estimates**

<b>FACTORS</b>	<b>Gravity Distribution Fact Sheet D1</b>	<b>Low Pressure Pipe Fact Sheet D2</b>	<b>Drip Distribution Fact Sheet D3</b>
Wastewater Flows gallons/day (gpd)	450	450	450
Topography	Relatively Flat	Relatively Flat	Relatively Flat
Application Rate (gpd/sq. ft.)	0.4	0.2	0.3
Soil Treatment Area (sq. ft.*)	1,125	2,250	1,500
Lateral Line (linear feet*)	562	1,125	750
Material & Installation	\$4,600 - \$6,900	\$9,000 - \$14,000	\$8,000 - \$12,000
Annual O&M	\$200 - \$400	\$540 - \$800	\$500 - \$740

**Note:** It is extremely rare that a drip distribution system within the state is designed with an application rate of 0.3 gpd/sq. ft. a more common application rate is 0.15 gpd/sq. ft.

The costs in Table C-2 (below) should be used for cost estimation purposes only. The costs are presumed to include all components for an OWTS serving a single family home on an individual lot and were compiled as part of a cursory survey of professionals within the onsite wastewater industry within the state. No specific documentation was collected as part of that survey. The actual costs can vary significantly depending upon site conditions and local economic factors. Engineering fees and other professional services are not included. A single family residence in the state is designed at 120 gpd/bedroom\*, averaging 3 bedrooms.

**Table C-2: Individual Onsite Wastewater Treatment System Capital Cost Estimates**

<b>FACTORS</b>	<b>Gravity Distribution</b>	<b>Low Pressure Pipe</b>	<b>Drip Distribution</b>
Wastewater Flows (gpd)	360	360	360
Application Rate (gpd/sq. ft.)	0.4	0.2	0.15
Soil Treatment Area (sq. ft.*)	900	1,800	2,400
Lateral Line (linear feet*)	450	900	1,200
Material & Installation	\$5,000 - \$8,000	\$9,000 - \$20,000	\$15,000 - \$25,000

**Large Scale Subsurface Soil Dispersal System:** The cost listed in Tables C-3, C-4 and C-5 (below) should be used for cost estimation purposes only. As described within the WERF Fact Sheets (D1, D2 & D3), the costs reflect only those associated with the dispersal system itself and do not include cost for any part of the wastewater treatment prior to the dispersal system. The estimated costs below do not include the cost of engineering, other professional fees, the cost to close the current wastewater treatment facility or the cost of land acquisition. Cost includes 20percent for overhead and profit for contractor. The actual costs can vary significantly depending upon site conditions and local economic factors. Costs given within the WERF Fact Sheets reflect 2009 dollars.

**Table C-3: 5,000 Gallons per Day or 20 Home Capital Cost Estimates**

<b>FACTORS</b>	<b>Gravity Distribution Fact Sheet D1</b>	<b>Low Pressure Pipe Fact Sheet D2</b>	<b>Drip Distribution Fact Sheet D3</b>
Topography	Relatively Flat	Relatively Flat	Relatively Flat
Application Rate (gpd/sq. ft.)	0.4	0.2	0.15
Soil Treatment Area (sq. ft.*)	12,500	25,000	33,332
Lateral Line (linear feet*)	6,250	12,500	16,666
Material & Installation	\$54,000 - \$81,000	\$84,000 - \$127,000	\$74,000 - \$112,000
Annual O&M	\$2,300 - \$3,400	\$4,900 - \$7,400	\$3,000 - \$5,000



**TABLE C-4: 10,000 Gallons per Day or 40 Home Capital Cost Estimates**

<b>FACTORS</b>	<b>Gravity Distribution Fact Sheet D1</b>	<b>Low Pressure Pipe Fact Sheet D2</b>	<b>Drip Distribution Fact Sheet D3</b>
Topography	Relatively Flat	Relatively Flat	Relatively Flat
Application Rate (gpd/sq. ft.)	0.4	0.2	0.15
Soil Treatment Area (sq. ft. *)	25,000	50,000 or 1.1 ac*	66,666
Lateral Line (linear feet*)	12,500	25,000	33,332
Material & Installation	\$105,000 - \$158,000	\$184,000 - \$275,000	\$170,000 - \$254,000
Annual O&M	\$4,400 - \$6,600	\$10,000 - \$15,000	\$6,900 - \$10,000

**TABLE C-5: 50,000 Gallons per Day or 200 Home Capital Cost Estimates**

<b>FACTORS</b>	<b>Gravity Distribution Fact Sheet D1</b>	<b>Low Pressure Pipe Fact Sheet D2</b>	<b>Drip Distribution Fact Sheet D3</b>
Topography	Relatively Flat	Relatively Flat	Relatively Flat
Application Rate (gpd/sq. ft.)	0.4	0.2	0.15
Soil Treatment Area (acres*)	2.9	5.7	7.6
Lateral Line (linear feet*)	62,500	125,000	166,666
Material & Installation	\$517,000 - \$776,000	\$1,365,000 - \$2,047,000	\$658,000 - \$988,000
Annual O&M	\$21,000 - \$31,000	\$66,000 - \$98,000	\$31,000 - \$47,000

**Note:** There is no known gravity distribution systems within the state of the size represented in Tables C-3, C-4, or C-5 (above).

**Centralized:** When estimating the cost of converting an existing centralized domestic wastewater collection and treatment system from a point discharge to a subsurface soil dispersal system, refer to Table C-3, C-4 or C-5 (above) for the different systems and daily wastewater flow they service. These costs will be used to determine the predicted cost to decentralize, as the costs will be similar due to costs are based on flow.

#### **Current Wastewater System Closures:**

**Lagoon:** If the municipality chooses to proceed with decentralizing the wastewater treatment utility, the current lagoon or sand filter will need to be properly closed according to Standard Conditions Part III the current NPDES operating permit. The Department has estimated the cost of a lagoon closure to be approximately \$30,000. The cost of sludge removal varies, depending on the total amount of sludge in the lagoon; however, each municipality can use the following equation to estimate the cost of sludge removal.

- Dredging and disposal: \$750 per dry ton
- Mobilization and set up: \$25,000 flat rate

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**Estimated Cost for Sludge Removal** = (Dry tons of sludge per year x Life span of lagoon in years x \$750 per dry ton of sludge) + \$25,000 mobilization fee.

\* Calculations made using standards set forth by the Missouri Clean Water Law (Chapter 644) and its regulations along with those set forth by RSMo 701.025 through 701.059 and the regulations promulgated under it.

**Use a cost estimate from the examples provided above to determine what an estimated cost would be for your municipality to decentralize. Please include the estimated cost to properly close your current wastewater treatment system. If it is determined that the cost to decentralize the current sewer utility will result in a substantial and widespread social and economic impact, please include a statement attached to your application based on the statement provided below:**

The city of *(insert your municipal name here)* has considered the cost to decentralize/install an on-site system in place of the current discharging system. Based on the estimates provided by the Department, the city has determined the cost to properly close the current lagoon to be *(Based on the numbers found above include the cost to close current facility plus the cost to remove sludge/pump out septic tank, \$X.XX)*. With the city's current flow of *(Insert design flow here XXXXX gpd)* the estimated primary cost to install the onsite wastewater treatment system is *(\$x.xx, use an example shown in tables D-3, D-4 or D-5 based on the design flow of the facility)*. The estimated cost of land to decentralize/install an on-site is *(\$x.xx, insert cost of land here. The price of land is shown below.)* This cost would result in residential user rates of *(See user rate equation on page 40 and calculate the user cost and insert here, \$X.XX)* per residential user per month. The estimated residential user cost as a percent of the median household income (MHI) is calculated to be *(See user rate as a % of MHI equation below and calculate the percentage and insert here, X.X%)*. According to EPA's financial capability assessment guidance, "Combined Sewer Overflows: Guidance for Financial Capability Assessment and Schedule Development," a residential user cost as a percent of MHI of over two percent will result in a "high financial impact." Therefore, decentralization of the sewer utility is not a feasible alternative for the *(insert municipal name here)* at this time. The estimates provided by the Department anticipate the costs incurred from this alternative would result in a substantial and widespread economic and social impact for the residents of our community.

### **Calculations and References:**

#### **Cost of Land:**

**Total cost of land** = (amount of land (in acres)) (cost of land per acre listed above)

#### **Primary Rate Equation: (using Tables C-3, C-4, or C-5)\***

**Estimated Primary Rate** = (annual O & M x 20 years) + material and installation costs

\*The option of a drip irrigation system will be used to determine the primary rate.

**User Rate Equation:**

**Estimated monthly residential user rate** = (Primary Rate + estimated land costs + estimated cost to remove sludge + \$30,000 for lagoon closure) / 20 years / 12 months / number of active connections to WWTF

Note: The number of connections is specific to your community and can be found on the Cost Analysis for Compliance written by the Department.

**User rate as a percent of MHI Equation:**

**Estimated monthly user rate as a percent of MHI** = [Estimated monthly residential user rate / (Median Household Income/12)] 100

Note 1: The estimated monthly residential user rate is calculated using the user rate equation

Note 2: The Median Household Income is specific to your community and can be found of the Cost Analysis for Compliance written by the Department.

**Sludge Removal Equation:**

**Estimated Cost for Sludge Removal** = (Dry tons of sludge per year x Life span of lagoon in years x \$750 per dry ton of sludge) + \$25,000 mobilization fee.

**Definitions:**

Present Worth: reflects the total costs necessary for constructing a new treatment plant and implementing corresponding operation and maintenance over the facility's life span, and is calculated using a 5 percent annual interest rate.

Capital Cost of Project: includes project costs, design, inspection and contingency costs.

Annual cost of Operation and Maintenance: includes operations, maintenance, materials, chemical and electrical costs for the facility on an annual basis. It also includes items that are expected to replace during operations, such as pumps. Operation and maintenance is estimated between 15 percent and 45 percent of the user cost.

Estimated resulting user cost per household: composed of two factors, Operation & Maintenance (O&M), and Debt Retirement Costs.

## **NATURAL HERITAGE REVIEW REPORT**

Each applicant is required to provide justification using the Natural Heritage Review Report (NHRR) detailing how the MDV will not cause an impact to federally-listed and/or state-listed threatened or endangered species (designated or proposed) or their critical habitat that are known to be present at the point of discharge. First, the applicant must use the Missouri Natural Heritage Review website (<https://naturalheritagereview.mdc.mo.gov>) to query for records of Species and Natural Communities of Conservation Concern, public conservation lands, and other sensitive forest, fish and wildlife resources that could be affected by construction and development projects.

If a Level One response is received, there are no known records of Species and Natural Communities of Conservation Concern within the project area. No further coordination with the Missouri Department of Conservation is necessary, although additional information may be provided in the response for planning purposes and to help reduce impacts to forest, fish and wildlife.

If a Level Two response is received, records of state-listed Species and Natural Communities of Conservation Concern occur within or near the project area. Please contact the Missouri Department of Conservation for further coordination and information. In addition, further coordination and consultation with the U.S. Fish and Wildlife Service (USFWS) for USFWS trust resources including Endangered Species Act species, may be necessary depending on the project, its location and construction practices. Please visit the U.S. Fish and Wildlife Website – Information for Planning and Conservation at <https://ecos.fws.gov/ipac/> for additional information or contact the USFWS.

If a Level Three response is received, records of federal, and possibly also state-listed Species and Natural Communities of Conservation Concern occur within or near the project area. Please contact the Missouri Department of Conservation for further coordination and information. In addition, further coordination and consultation with the USFWS for USFWS trust resources including Endangered Species Act species, is necessary. Please visit the U.S. Fish and Wildlife Website – Information for Planning and Conservation at <https://ecos.fws.gov/ipac/> for additional information or contact the USFWS.

Please include the following items when submitting your Natural Heritage Review request to the Missouri Department of Conservation or the USFWS:

- Township, Range & Section or Latitude and Longitude of project location
- Aerial map of project location
- A description of project activities; for example, replacement of a concrete low water crossing with a 30-foot long span bridge, and submit project designs
- ArcGIS data layers or .kmz files with the project's location will help expedite reviews of most projects

The request may be submitted to the Missouri Department of Conservation by postal mail at the following addresses:

Attn: Natural Heritage Review Coordinator  
Resource Science Division  
Missouri Department of Conservation

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2901 West Truman Boulevard  
P.O. Box 180  
Jefferson City, MO 65102  
573-522-4115 ex 3182

Staff of the USFWS may be contacted by phone at 573-234-2132, or through postal mail at:  
U.S. Fish and Wildlife Service  
Ecological Services  
101 Park Deville Drive, Suite A  
Columbia, Missouri 65203-0007

**Please follow the letter template provided on the next page to complete the inquiry request for the NHRR and mail to the Missouri Department of Conservation address provided above.**

To Whom It May Concern:

The city of **(Include your city or village name here)** is requesting a Natural Heritage Review Report (NHRR) be completed at our wastewater treatment plant outfall. The type of project being completed is for a variance of the water quality standards for Total Ammonia Nitrogen at the point of discharge from the city's domestic wastewater treatment facility. The location of the outfall is **(include Township/Range/Section and the Latitude/Longitude in decimal degrees of the outfall)**. The facility is currently permitted to discharge to **(name of receiving stream)**. Please see the attached map for an aerial view of the location.

If you have any questions concerning this inquiry for the NHRR, please do not hesitate to contact **(facility contact name here)** by phone at **(contact's phone number)**, by email at **(contact's email address)**, or myself by phone at **(Department staff that is assisting with application - phone number)** or by my email at **(Department staff that is assisting with application - email address)**.

*This has been read and agreed to by the city of **(name here)**'s facility contact **(name here)**.*

\_\_\_\_\_  
Facility Contact Signature

\_\_\_\_\_  
Date

## **Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts and Cost Analysis for Compliance**

### **WESI**

The Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impact: Public Sector spreadsheet (WESI) is used to assist the State in implementing the recommendations in EPA’s Interim Economic Guidance for Water Quality Standards. The spreadsheet guides the user through the necessary calculations to successfully determine if a substantial and widespread economic and social impact will occur within the community due to the costs associated with complying with a specific Water Quality Standard. The spreadsheet consists of a five part process.

1. Verify Project Costs and Calculate the Annual Cost of the Pollution Control Project.
2. Calculate Total Annualized Pollution Control Costs per Household.
3. Calculate and Evaluate the Municipal Preliminary Screener Score.
4. Apply the secondary test.
5. Assess where the community falls in the substantial impacts matrix.

The guidance directs the applicant to calculate the total annual cost of pollution control per household by considering the current cost of pollution control along with the projected annual costs of the proposed pollution control project. Therefore, the spreadsheet will first calculate the annualized estimated capital cost of the project using an annualization factor and then add the annualized capital cost to the estimated annual operation and maintenance costs to determine the “total annual cost of pollution control project.” The guidance then directs the applicant to use the spreadsheet to calculate the “total annual pollution control cost per household” by adding the current pollution control costs to the total annual cost of pollution control and dividing by the number of active connections within the community.

The total annual pollution control cost per household is then divided by the median household income of the community and multiplied by 100 in order to determine the MPS. If the community’s MPS falls within 1 to 2 percent or greater than 2 percent, the guidance directs the applicant to apply the secondary socioeconomic test. The secondary socioeconomic test was developed to determine whether or not substantial economic impacts could occur. Applicants are required to present 6 indicators: bond rating (if applicable), overall net debt as a percent of full market value of taxable property, unemployment rate, median household income, property tax revenue as a percent of full market value of taxable property, and property tax collection rate. The 6 indicators are then scored on a point scale as either weak (1 point), mid-range (2 points), or strong (3 points). The sum of the scores is averaged to determine the “Secondary Test Score.” The Secondary Test Score is then matched with the MPS in a matrix.

The substantial impacts matrix indicates whether or not the applicant will experience a substantial impact as a result of the new cost per household due to the proposed pollution control. The results from the MPS and the Secondary Test are considered jointly to determine the potential impact. The results from the matrix are one of three options: impact is likely substantial, impact is not likely to be substantial, and the impact is unclear.

EPA notes that there are no explicit criteria by which to evaluate widespread impacts and it is the applicant’s responsibility to provide additional information that would justify the need for a variance of a water quality standard. However, for communities that fall under the “impact is likely to be substantial” and “impact is unclear” categories, the WESI provides a worksheet titled, “Qualitative Description of

Estimated Change in Socioeconomic Indicators Due to Pollution Control Costs” which guides the applicant to estimate the following adverse impacts on the local community due to the increase of pollution control costs. EPA notes this spreadsheet will assist in the determination on whether or not substantial impacts will also be widespread. The following indicators within the WESI guidance are:

- Estimated change in applicant’s median household income;
- Estimated change in the unemployment rate;
- Estimated change in overall net debt as a full market value of taxable property;
- Estimated change in the percent of households below the poverty line;
- Impact on commercial development potential; and
- Impact on property values.

### **CAFCom**

The CAFCom was developed by the Department to meet the requirements of 644.145, RSMo. The CAFCom estimates the potential cost for POTWs to comply with new requirements in a permit. The CAFCom serves as the basis for determining an adequate schedule of compliance to include within the permit as well as a tool to determine if an applicant could be eligible for a variance of water quality standards. The CAFCom analysis consists of eight measures regarding the estimated cost for pollution control and the financial situation of each applicant. An example of a CAFCom can be found in the fact sheet with renewed POTW permits that have a new requirement with an associated cost. <http://dnr.mo.gov/env/wpp/permits/issued/wpcpermits-issued.htm>.

The eight measures are as follows:

1. A community's financial capability and ability to raise or secure necessary funding;
2. Affordability of pollution control options for the individuals or households at or below the median household income level of the community;
3. An evaluation of the overall costs and environmental benefits of the control technologies;
4. Inclusion of ongoing costs of operating and maintaining the existing wastewater collection and treatment system, including payments on outstanding debts for wastewater collection and treatment systems when calculating projected rates;
5. An inclusion of ways to reduce economic impacts on distressed populations in the community, including but not limited to low- and fixed-income populations. This requirement includes but is not limited to:
  - a. Allowing adequate time in implementation schedules to mitigate potential adverse impacts on distressed populations resulting from the costs of the improvements and taking into consideration local community economic considerations; and
  - b. Allowing for reasonable accommodations for regulated entities when inflexible standards and fines would impose a disproportionate financial hardship in light of the environmental benefits to be gained;
6. An assessment of other community investments and operating costs relating to environmental improvements and public health protection;
7. An assessment of factors set forth in EPA’s guidance, including but not limited to the "Combined Sewer Overflow Guidance for Financial Capability Assessment and Schedule Development" that

## Appendix D – WESI and CAFCom

may ease the cost burdens of implementing wet weather control plans, including but not limited to small system considerations, the attainability of water quality standards, and the development of wet weather standards; and

8. An assessment of any other relevant local community economic condition.

If it is determined that the applicant must construct and install new pollution control infrastructure in order to meet the permit requirements, the permit writer uses CapDet, a preliminary design and costing software program from Hydromantis, or if available, actual engineering design reports from the municipality's contracted engineer in order to determine the estimated costs associated with the construction of a mechanical treatment plant and a no-discharge wastewater irrigation system. The estimated costs are based off the applicant's location within the state, design flow, and active connections. CapDet estimates the cost of four different types of mechanical treatment and two different scenarios of wastewater irrigation.

- Extended aeration oxidation ditch
- Extended aeration package plant (up to 50,000 gpd)
- Sequencing batch reactor
- Extended aeration plant
- Wastewater irrigation (up to 150,000 gpd) utilizing the existing lagoon as a storage basin
- Wastewater irrigation (up to 150,000 gpd) with the construction of a brand new storage basin

The permit writer will use the least expensive mechanical treatment type to complete the analysis and characterize this type as the most "practical mechanical treatment option" for the applicant as well as both wastewater irrigation options to complete the analysis.

Once the estimated costs are calculated, the per-household cost is by utilizing the estimated total present worth is determined. The total present worth includes the operation and maintenance costs as well as the capital cost to build the project (consisting of design, inspection, and contingency costs). The cost per user is costed out over a time period based on the expected life of the facility; 20 years for a mechanical treatment plant and 30 years for a wastewater irrigation system. If the applicant still has debt associated with their current treatment plant, the amount within their current user rate used toward paying debt retirement is added to the estimated user rate to determine the cost per user. The cost per user is then divided by the applicant's median household income and multiplied by one hundred to determine the cost per user as a percentage of median household income, which is characterized as the Residential Indicator (RI).

The CAFCom analysis incorporates the secondary socioeconomic test developed by the EPA along with two additional socioeconomic indicators in order to determine whether or not substantial economic impacts could occur. Applicants are required to present 8 indicators: bond rating (if applicable), overall net debt as a percent of full market value of taxable property, unemployment rate, median household income, percent of households in poverty, percent of households relying on food stamps, property tax revenue as a percent of full market value of taxable property, and property tax collection rate. The 8 indicators are scored as weak (1 point), Mid-Range (2 points), Strong (3 points). The socioeconomic data for each applicant are compared to the State of Missouri's current data for each corresponding category. The points are added and averaged in order to determine the Financial Capability Indicator (FCI).

The CAFCom utilizes a matrix to determine the degree of financial burden the new requirement within the permit could place on the residents of the community. The matrix matches the RI with the FCI which concludes whether the residents may experience a low, medium or high financial burden as a result of



new pollution control. This is one of the criteria taken into consideration when the permit writer establishes a schedule of compliance.

The additional information within the cost analysis serves as supplementary information detailing the applicant's unique socioeconomic situation. The permit writer also details the overall costs and environmental benefits of the control technologies within the analysis. It is important that the applicant is well aware of the social, environmental, and economic benefits of investing in wastewater treatment.

The analysis includes the applicant's unemployment rate, adjusted median household income, percent change in MHI (2000 to 2015), percent population growth/decline (2000 to 2015), change in median age in years (2000 to 2015), percent of households in poverty, and percent of households relying on food stamps.

The CAFCom also includes an assessment of other community investments and operating costs relating to environmental improvements and public health protection as well as any other relevant community economic conditions. The permit writer uses the Rural MoSAT and information provided by the community to complete this portion of the analysis. The State of Missouri contracted with Wichita State University to complete an assessment tool that would allow for predictions on rural Missouri community populations and future sustainability. More information on the MoSAT tool is located in Appendix F.

The permit writer utilizes all of the socio-economic factors of the community along with the results from the Financial Capability Matrix included within the CAFCom in order to determine an adequate schedule of compliance to be included in the permit.

#### **WESI/ CAFCom Differences:**

The WESI along with the guidance document "Interim Economic Guidance for Water Quality Standards" was created by the EPA in 1995 with the intention of assisting the States in understanding the economic factors that may be considered, and the types of tests that can be used to determine if a designated use cannot be attained. The Cost Analysis for Compliance was created in 2012 when 644.145, RSMo was signed into law which states the Department of Natural Resources shall make a finding of affordability in the costs to be incurred and the impact of any rate changes on ratepayers upon which to base such permits and decisions, to the extent allowable under Chapter 644 of the Missouri Statutes and the Federal Water Pollution Control Act. The "Interim Economic Guidance for Water Quality Standards" and the complementary spreadsheet, "Uses and Variances – Evaluating Substantial and Widespread Economic and Social Impacts" were used as a reference during the creation of the Cost Analysis for Compliance. Though the two analyses are similar in function, the differences cause discrepancy in the outcomes in some instances.

- The most notable difference between the two analyses is the difference in estimating the per-household costs to comply with requirements. The Interim Economic Guidance for Water Quality Standards guides the applicant to first sum the annualized capital cost of the project with the projected annual operation and maintenance costs to determine the total annual cost of a pollution control project. The guidance, then directs the applicant to sum the current pollution control costs with the total annual cost of pollution control project in order to determine the total annual control cost per household. This number is then divided by the applicant's median household income in order to determine the per-household cost as a percent of the applicant's median household income characterized at the MPS. By adding the current pollution control costs with the total annual cost of a new pollution control project, the WESI analysis assumes that cost associated with the existing treatment system will continued to be paid for by customers throughout the life of the new pollution control system. This assumption is not entirely appropriate in instances of complete treatment plant replacement.

The CAFCom determines the estimates per-household costs using a different approach. The per-house cost is estimated by using the total present worth of the selected treatment type and dividing that by the number of active connections and including inflation factors as well as interest on the loan. The total present worth includes the capital cost to design, inspect, and build the infrastructure, as well as contingency costs, costs to operate the facility, maintenance of the facility, materials, chemicals, energy costs, and includes labor costs all over 20 years for a mechanical plant and 30 years for a wastewater irrigation facility. If the applicant still has debt associated the current lagoon system, the amount within the current rate that is used toward debt retirement will be added to the projected per-household cost. This number is then divided by the applicant's median household income to determine the per-household cost as a percent of median household income which is characterized in the CAFCom as the residential indicator (RI).

It has been noted that when the Department uses the CapDet estimated capital cost and operation and maintenance costs for pollution control in the WESI spreadsheet, a larger MPS is calculated than if the same CapDet values are used to determine the RI through the cost analysis. The reason for this is because the Department only includes current costs that will need to be paid throughout the life of the new pollution control system within the calculation of the projected costs per-household, whereas, the WESI includes the current pollution control costs in its entirety. The Department does not believe it is necessary to include existing pollution control costs within the calculation other than existing debt retirement related to current infrastructure, as the total present worth of the project includes the operation and maintenance of the new wastewater treatment plant.

- The CAFCom incorporates supplementary social data within the discussion sections to support the applicant's unique socioeconomic situation which guides the permit writer to make an informed determination on the applicant's overall financial and economic health. The WESI guides the applicant to estimate the future change in certain socioeconomic areas as a result of the new costs associated with compliance, however, it is the Department's opinion that factual data which incorporates the past and current status of the applicant's socioeconomic health is necessary to cite when estimating future projections. The CAFCom incorporates the following social circumstances which are not found within the WESI:
  - Current poverty level;
  - Current unemployment rate;
  - Percentage of households receiving food stamps;
  - Percent change in median household income from 2000 to 2013;
  - Percent of population growth/decline from 2000 to 2013;
  - Median age of the residents;
  - An assessment of other community investments and operating costs relating to environmental improvements and public health protection;
  - Percent of households in poverty and percent of household relying on food stamps were added as socioeconomic indicators to the secondary socioeconomic test; and
  - The MoSAT (see Appendix F) finding which further incorporates key demographic and economic factors that have been shown to predict future changes in rural population growth and decline. Each rural community within Missouri has received an overall rating of their growth potential.

The Department will include both analyses for each applicant when issuing a permit under the terms and conditions of the MDV. It is the Department's stance that the analyses are complementary and provide a thorough examination of each applicant's overall socioeconomic condition.

**644.145, RSMo**

**Affordability finding required, when--definitions--procedures to be adopted--appeal of determination--annual report, contents.**

644.145, RSMo.

1. When issuing permits under this chapter that incorporate a new requirement for discharges from publicly owned combined or separate sanitary or storm sewer systems or water or sewer treatment works, or when enforcing provisions of this chapter or the Federal Water Pollution Control Act, 33 U.S.C. Section 1251, et seq., pertaining to any portion of a publicly owned combined or separate sanitary or storm sewer system or water or sewer treatment works, the Department of natural resources shall make a finding of affordability on the costs to be incurred and the impact of any rate changes on ratepayers upon which to base such permits and decisions, to the extent allowable under this chapter and the Federal Water Pollution Control Act.
2. (1) The Department of natural resources shall not be required under this section to make a finding of affordability when:
  - (a) Issuing collection system extension permits;
  - (b) Issuing National Pollution Discharge Elimination System operating permit renewals which include no new environmental requirements; or
  - (c) The permit applicant certifies that the applicable requirements are affordable to implement or otherwise waives the requirement for an affordability finding; however, at no time shall the Department require that any applicant certify, as a condition to approving any permit, administrative or civil action, that a requirement, condition, or penalty is affordable.
- (2) The exceptions provided under paragraph (c) of subdivision (1) of this subsection do not apply when the community being served has less than three thousand three hundred residents.
3. When used in this chapter and in standards, rules and regulations promulgated pursuant to this chapter, the following words and phrases mean:
  - (1) "Affordability", with respect to payment of a utility bill, a measure of whether an individual customer or household with an income equal to or lower than the median household income for their community can pay the bill without undue hardship or unreasonable sacrifice in the essential lifestyle or spending patterns of the individual or household, taking into consideration the criteria described in subsection 4 of this section;
  - (2) "Financial capability", the financial capability of a community to make investments necessary to make water quality-related improvements;
  - (3) "Finding of affordability", a Department statement as to whether an individual or a household receiving as income an amount equal to or lower than the median household income for the applicant community would be required to make unreasonable sacrifices in

the individual's or the household's essential lifestyle or spending patterns or undergo hardships in order to make the projected monthly payments for sewer services. The Department shall make a statement that the proposed changes meet the definition of affordable, or fail to meet the definition of affordable, or are implemented as a federal mandate regardless of affordability.

4. The Department of natural resources shall adopt procedures by which it will make affordability findings that evaluate the affordability of permit requirements and enforcement actions described in subsection 1 of this section, and may begin implementing such procedures prior to promulgating implementing regulations. The commission shall have the authority to promulgate rules to implement this section pursuant to chapters 536 and 644, and shall promulgate such rules as soon as practicable. Affordability findings shall be based upon reasonably verifiable data and shall include an assessment of affordability with respect to persons or entities affected. The Department shall offer the permittee an opportunity to review a draft affordability finding, and the permittee may suggest changes and provide additional supporting information, subject to subsection 6 of this section. The finding shall be based upon the following criteria:
  - (1) A community's financial capability and ability to raise or secure necessary funding;
  - (2) Affordability of pollution control options for the individuals or households at or below the median household income level of the community;
  - (3) An evaluation of the overall costs and environmental benefits of the control technologies;
  - (4) Inclusion of ongoing costs of operating and maintaining the existing wastewater collection and treatment system, including payments on outstanding debts for wastewater collection and treatment systems when calculating projected rates;
  - (5) An inclusion of ways to reduce economic impacts on distressed populations in the community, including but not limited to low- and fixed-income populations. This requirement includes but is not limited to:
    - (a) Allowing adequate time in implementation schedules to mitigate potential adverse impacts on distressed populations resulting from the costs of the improvements and taking into consideration local community economic considerations; and
    - (b) Allowing for reasonable accommodations for regulated entities when inflexible standards and fines would impose a disproportionate financial hardship in light of the environmental benefits to be gained;
  - (6) An assessment of other community investments and operating costs relating to environmental improvements and public health protection;
  - (7) An assessment of factors set forth in EPA's guidance, including but not limited to the "Combined Sewer Overflow Guidance for Financial Capability Assessment and Schedule Development" that may ease the cost burdens of implementing wet weather control plans, including but not limited to small system considerations, the attainability of water quality standards, and the development of wet weather standards; and
  - (8) An assessment of any other relevant local community economic condition.
5. Prescriptive formulas and measures used in determining financial capability, affordability, and thresholds for expenditure, such as median household income, should not be considered to be the only indicator of a community's ability to implement control technology and shall

be viewed in the context of other economic conditions rather than as a threshold to be achieved.

6. Reasonable time spent preparing draft affordability findings, allowing permittees to review draft affordability findings or draft permits, or revising draft affordability findings, shall be allowed in addition to the Department's deadlines for making permitting decisions pursuant to section 644.051.
7. If the Department of natural resources fails to make a finding of affordability where required by this section, then the resulting permit or decision shall be null, void and unenforceable.
8. The Department of natural resources' findings under this section may be appealed to the commission pursuant to subsection 6 of section 644.051.
9. The Department shall file an annual report by the beginning of the fiscal year with the governor, the speaker of the house of representatives, the president pro tempore of the senate, and the chairs of the committees in both houses having primary jurisdiction over natural resource issues showing at least the following information on the findings of affordability completed in the previous calendar year:
  - (1) The total number of findings of affordability issued by the Department, those categorized as affordable, those categorized as not meeting the definition of affordable, and those implemented as a federal mandate regardless of affordability;
  - (2) The average increase in sewer rates both in dollars and percentage for all findings found to be affordable;
  - (3) The average increase in sewer rates as a percentage of median house income in the communities for those findings determined to be affordable and a separate calculation of average increases in sewer rates for those found not to meet the definition of affordable;
  - (4) A list of all the permit holders receiving findings, and for each permittee the following data taken from the finding of affordability shall be listed:
    - (a) Current and projected monthly residential sewer rates in dollars;
    - (b) Projected monthly residential sewer rates as a percentage of median household income; and
    - (c) Percentage of households at or below the state poverty rate.

(L. 2011 H.B. 89, A.L. 2012 H.B. 1251, A.L. 2014 S.B. 642 merged with S.B. 664, A.L. 2015 H.B. 92 merged with S.B. 497)

## **CAPDEWORKS**

The Department currently uses software to estimate the cost for reconstruction of a treatment plant titled CapDet. CapDet is a preliminary design and costing software program from Hydromantis for wastewater treatment plants that uses national indices, such as the Marshall and Swift Index and Engineering News Records Cost Index for pricing in development of capital, operating, maintenance, material, and energy costs for each treatment technology. As the program works from national indices and each community is unique in its budget commitments and treatment design, the estimated costs are expected to be higher than actual costs. The cost estimates located within this document are for the construction of a brand new treatment facility or system that is the most practical to facilitate compliance with new requirements. For the most accurate analysis, it is essential that the permit holder provides the Department with current information about the city's financial and socioeconomic situation.

The design parameters for Hydromantis are for larger facilities with flows greater than most Missouri facilities are designed for, therefore, CapDet provides a cost estimate based on national averages, not site-specific conditions a community or state may face. In developing design parameters, the Department's engineers selected ammonia effluent limits of 0.6 mg/L and assumed a peaking factor of 3:1, and assumed normal strength municipal wastewater characteristics.

**Verification Process:** The cost estimates are verified through the tracking of actual costs from submitted facility plans, engineering reports, bid documents, and loan closures. This verification process allows the engineering section to track costs to see if the assumptions in the CAFCom Spreadsheet and from CapDet are appropriate for the State of Missouri. Since the implementation of 644.145, RSMo, the Department has been tracking costs and has determined that the numbers in the CAFCom spreadsheet have been higher than the actual costs reported, but not significantly so. The engineering section works to track that the scopes of the actual projects meet the CAFCom scope of project. For the CAFCom for sampling and for inflow and infiltration work, the cost estimate used is based on actual contracts submitted to the Department.

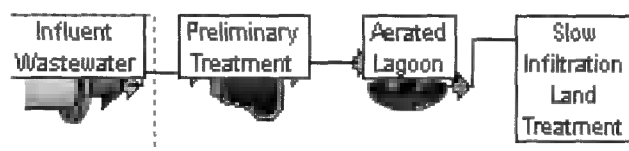
**Permit Writers Procedure:** The permit writers select the community that they are writing a permit for on the CAFCom Spreadsheet and input the permitted design flow and number of active connections to the facility. From there, the spreadsheet auto-calculates the cost of upgrades for that community from the five treatment technologies evaluated. Permit writers select the treatment technology cost estimate that they believe is most appropriate for the community based on size, location, and expected cost estimate. Then the permit writer uses the information from the CAFCom Spreadsheet to complete the CAFCom Appendix in the Operating Permit Factsheet. The CAFCom Evaluation aides in the determination of schedules of compliance and demonstrates other commitments a community may have.

**Treatment Technologies Evaluated:** The treatment technologies evaluated are for a range of flows up to 10 MGD; however, the majority of the permits and evaluations are for flows significantly less than that and more on the scale of 0.15 MGD or less. The technologies evaluated are wastewater irrigation utilizing existing basins, wastewater irrigation requiring new basins, a package plant, an extended aeration plant, an oxidation ditch, and a sequencing batch reactor. Wastewater irrigation is not evaluated for flows greater than 0.15 MGD and package plants are not evaluated for flows greater than 0.05 MGD. As the Department regulates thousands of communities with different flows, the CAFCom spreadsheet could not be developed with every possible design flow, so the spreadsheet utilizes linear interpolation for scenarios not ran. For treatment technologies, sludge handling, sludge treatment, and disinfection are not included in the capital, operations and maintenance, and annual or present worth costs. All treatment technologies

were designed to meet losing stream biochemical oxygen demand (BOD) and total suspended solids (TSS) of less than 10 mg/L and ammonia criteria.

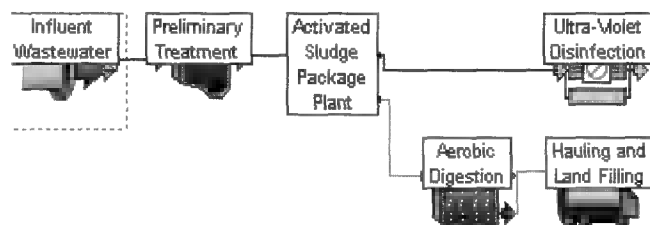
**Wastewater Irrigation:** Elimination of a discharge point is the ultimate goal of the Clean Water Act. As Missouri has approximately 365 publicly owned lagoon systems, the Department ran wastewater irrigation scenarios up to 0.15 MGD. While the scenarios were only ran for flows up to 0.15 MGD, there are existing communities in Missouri with higher flows currently using wastewater irrigation. For the communities and counties that are divided by the highways, the region where majority of the county resides is what was chosen for picking wastewater irrigation storage periods of 60 to 120 days. During the facility planning phase, the engineer will appropriately evaluate the correct minimum storage requirements. The low wastewater irrigation cost is the community not having to build new storage basins or get new operators beyond what they currently employ. The higher wastewater irrigation cost includes land for building new storage basins and new operator costs. The acreage required was based on the default design application rate of 24 inches per year. The acreage required for a wastewater irrigation system is estimated in CapDet and was verified with the Department's wastewater irrigation spreadsheet. Center pivots was the chosen wastewater irrigation technology for the spreadsheet as that is commonly used around the state.

**Figure E-1: Wastewater Irrigation System Design**



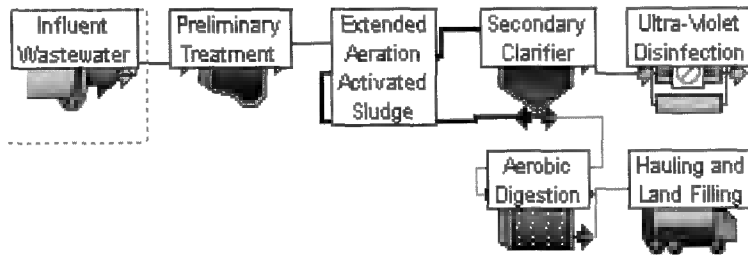
**Package Plant:** Extended aeration package plants are common on the private side and for the smaller Missouri communities may be appropriate treatment technology. Package plants are pre-manufactured treatment facilities. Design flows up to 0.05 MGD were ran based on experience that flows greater than 0.05 MGD usually require site-specific construction components and the costs assumptions for a package plant were very similar to the extended aeration plant at higher flows.

**Figure E-2: Package Plant System Design**



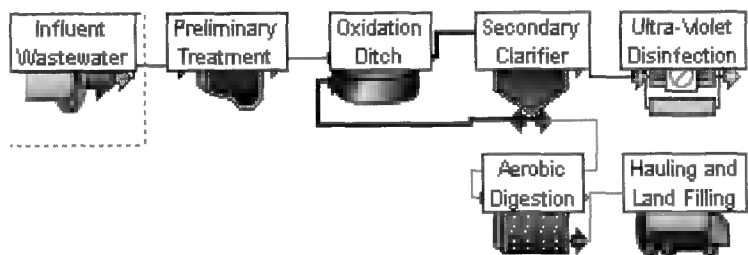
**Extended Aeration:** The extended aeration treatment plant processes the wastewater directly into the aeration tank for treatment, maintaining the aerobic process with long aeration times. In CapDet, scenarios were ran up to 10 MGD.

**Figure E-3: Extended Aeration System Design**



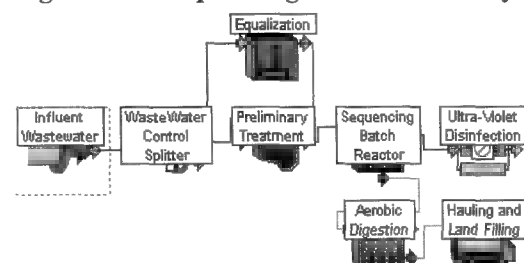
**Oxidation Ditch:** An oxidation ditch is a modified activated sludge biological treatment process that utilizes long solids retention times to remove biodegradable organics. Oxidation ditches are typically complete mix systems, but they can be modified to approach plug flow conditions. Typical oxidation ditch treatment systems consist of a single or multichannel configuration within a ring, oval, or horseshoe-shaped basin. As a result, oxidation ditches are called “racetrack type” reactors. Horizontally or vertically mounted aerators provide circulation, oxygen transfer, and aeration in the ditch.

**Figure E-4: Oxidation Ditch System Design**



**Sequencing Batch Reactors (SBR):** The SBR is an activated sludge process designed to operate under non-steady state conditions. An SBR operates in a true batch mode with aeration and sludge settlement both occurring in the same tank. The major differences between SBR and conventional continuous-flow, activated sludge system is that the SBR tank carries out the functions of equalization aeration and sedimentation in a time sequence rather than in the conventional space sequence of continuous-flow systems. In addition, the SBR system can be designed with the ability to treat a wide range of influent volumes whereas the continuous system is based upon a fixed influent flowrate. The operating principles of a batch activated sludge process, or SBR, are characterized in six discrete periods: anoxic fill, aerated fill, react, settle, decant, and idle. In the scenarios ran, the SBRs were designed from 0.02 MGD to 10 MGD with flow equalization.

**Figure E-5: Sequencing Batch Reactor System Design**





**Sample Calculations involved in the CAFCom****Equation E-1: Number of Connections**

Permit writers are directed to use the number of connections from question 8.3 from Form B (<http://dnr.mo.gov/forms/780-1512-f.pdf>) or questions 7.5 from Form B-2 (<http://dnr.mo.gov/forms/780-1805-f.pdf>). If the permit writer does not know the number of connections, the CAFCom Spreadsheet automatically estimates the number of connections based on 10 CSR 20-8 Design Guides. The CAFCom Spreadsheet rounds down the estimated number of connections.

$$\frac{\text{design flow in gallons per day}}{\left(\frac{100 \text{ gallons per day}}{\text{per capita}}\right) * \left(\frac{3.7 \text{ people}}{\text{per connection}}\right)} = \text{connections}$$

$$\frac{100,000 \text{ gpd}}{\left(\frac{100 \text{ gallons per day}}{\text{per capita}}\right) * \left(\frac{3.7 \text{ people}}{\text{per connection}}\right)} = 270.3 \text{ connections}$$

**Table E-1: Summary of Daily Design Flow to Default Connections.**

Flow (gpd)	Connections
10,000	27
20,000	54
50,000	135
70,000	189
100,000	270
120,000	324
150,0000	406

**Equation E-2: Capital Cost Calculation for Wastewater Irrigation Systems**

Capital costs are fixed, one-time expenses incurred during the construction of pollution control infrastructure. It is the total cost needed to bring a project to an operable status. Capital costs include design, labor, equipment, material costs, acreage, and contingency costs. These costs were estimated with the CapDet program. Below is the estimated capital cost for wastewater irrigation system for 0.1 MGD facility with an existing lagoon located in Scotland County. In Scotland County, from the Missouri Land Survey the cost per acre for acreage is \$3,858 per acre and a 0.1 MGD system will need an estimated 68 acres.

$$\text{Capital Cost for Land} = \$3,858 * 68 = \$262,344$$

$$\text{Total Capital Costs} = \text{Capital Cost of Land Application System} + \text{Capital Cost of Land}$$

$$\text{Total Capital Cost} = \$2,163,606 + \$262,344 = \$2,425,950$$

**Equation E-3: Annualization Factor**

The Annualization Factor is calculated, which is the total amount of interest foregone is averaged over the life of the project, so that the resulting figure is the same from year to year. To get the Annualization factor, which is based on the rate of interest (5 percent) and the expect life of the capital asset (20 years). The Annualization factor is calculated with the equation below:

$$\frac{\text{Interest rate} * (1 + \text{interest rate})^{\text{equipment life}}}{(1 + \text{interest rate})^{\text{equipment life}} - 1} = \frac{0.05(1 + 0.05)^{20}}{(1 + 0.05)^{20} - 1} = 0.08024$$

**Equation E-4: Annualized Capital Cost**

To get the annualized capital cost of the capital cost, the estimated capital cost from CapDet is multiplied by the calculated annualization factor. By annualizing the capital cost, this allows the total amount of interest foregone is average over the life of the asset, resulting in the same cost over the life of the project.

$$\text{Capital Cost} * \text{Annualization Factor} = \$2,425,950 * 0.08024 = \$194,665$$

**Equation E-5: Debt Retirement**

The CAFCom Spreadsheet employs the Microsoft Excel PMT function. The PMT function calculates the payment for a loan based on constant payments and a constant interest rate. The Microsoft Excel function is PMT(rate,nper,pv,fv,type). Rate is the interest rate per period, assumed at 5 percent in the calculation. NPer is the number of periods over which the loan or investment is to be paid, 20 years. PV is the present value of the load/investment, which is the capital cost. FV is an optional argument that specifies the future value of the loan at the end of nper payments and if omitted has the default value of 0. The default value is used in the debt retirement calculation. Type is an optional argument that defines whether the payment is made at the start or the end of the period. If the type argument is omitted, the default value of 0 is used denoting that payment made at the end of the period.

$$\text{PMT}(\text{rate}, \text{nper}, \text{pv}, \text{fv}, \text{type}) \Rightarrow \text{PMT}(5.0\%, 20 \text{ years}, \$2,425,950, 0, 0) = \$194,665$$

**Equation E-6: Monthly Debt Retirement per Connection**

In setting utility rates, the annual debt retirement must be distributed equitably across the year and all users. To calculate the monthly debt retirement cost per connection, the equation below was used. While the debt retirement equation could be modified to set the monthly retirement rate, this equation was used to ensure that the debt retirement equation units were consistently held as annual number.

$$\frac{\text{debt retirement per year}}{(\text{number of connections}) * 12 \frac{\text{months}}{\text{year}}} = \text{monthly debt retirement} \frac{\text{cost}}{\text{connection}}$$

$$\frac{\$194,665}{270 * 12 \frac{\text{months}}{\text{year}}} = \$60.02 \text{ monthly debt retirement} \frac{\text{cost}}{\text{connection}}$$

**Equation E-7: Annual Operations and Maintenance Cost**

The annual operations and maintenance cost was developed from CapDet and includes the following components: energy, labor, chemical, and material costs. The annual operations and maintenance costs includes an operator of the treatment plant, administrative costs, the electrical costs for running pumps and blowers, maintenance and material cost for replacement, and chemical costs for flocculants and coagulants that may be used. The overall annual operations and maintenance costs were calculated with the following equation.

$$\begin{aligned} & \text{Annual (energy cost + labor costs + chemical costs + material cost)} \\ & = \text{overall annual operations and maintenance cost} \end{aligned}$$

**Equation E-8: Present Worth Factor**

The formula for the present value factor is used to calculate the present value per dollar that is received in the future. The present value factor formula is based on the concept of time value of money. Time value of money is the idea that an amount received today is worth more than if the same amount was received at a future date. Assuming a 5 percent interest rate and 20 year period, the present worth factor is 12.46.

$$\begin{aligned} & \frac{(1 + \text{interest rate})^{(\text{equipment life})} - 1}{(\text{interest rate}) * (\text{interest rate} + 1)^{\text{equipment life}}} \\ & \frac{(1 + 0.05)^{(20)} - 1}{(0.05) * (0.05 + 1)^{20}} = 12.46 \end{aligned}$$

**Equation E-9: Present Worth**

Present worth, also known as net present value, is the sum of the present values of incoming and outgoing cash flows over the period of the loan. This value represents an amount of money at an initial time. The present worth allows for cost comparisons of different alternatives on the basis of a single cost figure for each alternative. The cost estimates were based on the CapDet program. The Department assumes a 20-year loan period with an interest rate set at the current rate for bonds on the market at the time of this analysis

$$\begin{aligned} & \text{Present Worth} \\ & = \text{Capital Cost} + (\text{Present Worth factor} * \text{Annual O\&M Costs}) \\ & + (\text{Present Worth factor} * \text{Other Costs}) - \text{Salvage Value} \end{aligned}$$

Using a 0.1 MGD wastewater irrigation facility with a 5 percent interest rate and 20 year life, the present worth of the system is

$$\text{Present Worth} = \$2,425,950 + (12.462 * 40,095) + (12.462 * 0) - 0 = \$2,663,278$$

**Equation E-10: Monthly O&M Cost per Connection**

$$\begin{aligned} & \frac{\text{annual operation and maintenance cost}}{(\text{number of connections}) * 12 \frac{\text{months}}{\text{year}}} = \text{monthly O\&M} \frac{\text{cost}}{\text{connection}} \\ & \frac{\$40,095}{270 * 12 \frac{\text{months}}{\text{year}}} = \$12.38 \text{ monthly O\&M} \frac{\text{cost}}{\text{connection}} \end{aligned}$$

**Equation E-11: Monthly Cost per User**

$$\begin{aligned} & \frac{\text{monthly OM cost}}{\text{connection}} + \frac{\text{monthly debt retirement}}{\text{connection}} = \text{monthly user cost per connection} \\ & \frac{\$12.38 \text{ monthly O\&M cost}}{\text{connection}} + \frac{\$60.02 \text{ monthly debt retirement}}{\text{connection}} \\ & = \$72.40 \text{ monthly user cost per connection} \end{aligned}$$

## Appendix E - CAPDEWORKS

The table below provides assumptions that were held consistent between all scenarios ran in CapDet treatment technologies. Unit costs come from the Marshall and Swift Index, Engineering News Records Cost Index, Pipe Cost Index, Hydromantis Equipment Cost Index, Hydromantis Construction Cost Index, and the Hydromantis Pipe Cost Index.

**Table E-2: Assumptions for all CapDet Scenarios**

Assumptions in CapDet	
Structural Lifespan	20 years
Pumps	10 years
Electricity	\$0.1/kWh
Administrative labor cost	\$25/hr
Lab labor cost	\$20/hr
Construction labor cost	\$32/hr
Legal Cost	2%
Miscellaneous Cost	5%
Engineering Design Cost	10%
Inspection Cost	2%
Contingency Cost	10%
Technical Cost	2%
Profit	0%

While there are thousands of assumptions built into CapDet, below is a summary of the major equipment costs provided. All equipment costs are developed from Hydromantis specific indices that include multiple national indices, including the Marshall and Swift Index and the Engineering News Record.

**Table E-3: CapDet Unit Costs**

Description	Value	Units
Building Cost	110	\$/sqft
Excavation	8	\$/cuyd
Wall Concrete	650	\$/cuyd
Slab Concrete	350	\$/cuyd
Crane Rental	250	\$/hr
Canopy Roof	20	\$/sqft
Electricity	0.1	\$/kWh
Hand Rail	75	\$/ft
Center Pivot 100 acre system	69,000	\$/unit
15 gpm sprinkler	230	\$/sprinkler
UV lamp installed	850	\$/lamp
UV replacement lamp	75	\$/lamp
6 inch PVC pipe	20	\$/ft
8 inch PVC pipe	28	\$/ft
12 inch butterfly valve	2300	\$/valve
16 inch pump	40,000	\$/pump
5 hp vertical turbine mixer	10,200	\$/mixer
2 ft mechanically cleaned bar screen	138,000	\$/unit



**Validation Report – Rural Missouri Sustainability Tool**  
*Capability of the Rural Population Sustainability Assessment Tool*  
*In Predicting Rural Missouri Community Population and Sustainability*

The purpose of this report is to present validity evidence of the ability of the Rural Population Sustainability Assessment Tool in predicting population change in rural Missouri communities. The capability of the assessment tool is predicated on the validity of the factor inputs in predicting rural population change and is demonstrated through the review of previous rural population studies, as well as the statistical modeling analysis which established the factors with the greatest ability to predict population change in rural Missouri communities.

**Review of Rural Population Studies:** Forty-five statistically significant predictive factors were found in past studies of rural population change in the U.S. These factors included population changes based on age, migration patterns, natural increase/decrease, density, citizenship, education, and employment, as well as sources of income, poverty status, local and state tax burden, government employment and revenue streams, proximity to metropolitan areas, natural amenities and recreational opportunities. These factors showed substantial ability to predict population growth and decline in a variety of rural settings. Data sources for these factors included the U.S. Census Bureau, Bureau of Labor Statistics, and the Missouri Departments of Revenue, Economic Development, and Vital Statistics, and the Economic Research Service of the USDA. All of the studies reviewed used counties within states as the unit of analysis. This was necessary as county level data is the most complete over all rural regions of the U.S.

**Statistical Analysis of the Predictive Sustainability Factors:** Although past studies found significant predictive power in these factors to determine rural population change across the U.S., equivalent predictive ability cannot be assumed for rural Missouri. To establish which factors would be valid predictors of population change in rural Missouri communities, a statistical analysis was conducted that included bivariate correlations of individual factors with overall population change and linear regression modeling to assess the collective ability of the factors to predict overall population change. The statistical analysis established which factors were valid predictors of population change in rural Missouri communities and candidates for inclusion in the assessment tool.

**Correlation Analysis Results:** Data for 745 rural towns and villages in Missouri were collected across a ten year span from 2000 to 2010. Incorporated rural Missouri towns and villages were the unit of analysis. Data was collected for forty-two relevant sustainability factors from U.S. Census, Missouri sources and the Economic Research Service-USDA. Change over a ten year period was computed for each predictive factor. Each individual sustainability factor was correlated with the change in overall population from 2000 to 2010 for each town and village. Thirty-two of the forty-two predictive sustainability factors showed statistically significant correlation coefficients at less than the .05 level. These sustainability factors included population by age, citizenship, migration, density, proximity to metropolitan areas, poverty status, and educational attainment, sources of

personal income, natural amenities and employment by industry sector. The correlation analysis indicated which sustainability factors specifically impacted overall population change in rural Missouri towns and villages. Sustainability factors with significant correlations became candidates for inclusion in the statistical model to determine which sustainability factors would be valid predictors for input into the assessment tool.

**Linear Regression Model:** Correlation analysis, being bivariate in nature, measures the capability of an individual sustainability factor to change in overall population but it does so in isolation from the other sustainability factors. This is insufficient for determining their validity as inputs into the assessment tool. Validity must be established for the sustainability factors as a collection of inputs into the tool. Often, individual predictors may behave differently in the presence of other predictors. They can show differing degrees of impact on population change than they displayed in a bivariate correlation analysis. It is necessary to model the sustainability factors together to determine those that will collectively yield the greatest predictive power.

Regression analysis was used to determine the predictive power of the sustainability factors on population change by incorporating all sustainability factors into a model. Regression accomplishes this by analyzing the effect of each sustainability factor on overall population change while holding the other sustainability factors constant. As the assessment tool is designed to guide decisions based on prediction by a collection of sustainability factors, regression analysis aids in modeling all of the factors and their collective power to predict change in rural populations. Sustainability factors that yield statistically significant regression coefficients were considered to be valid predictors of population change and used as inputs into the assessment tool.

The regression model used the change in overall population from 2000 to 2010 as the dependent variable and the remaining sustainability factors were regressed using a forced entry method to measure their effect. The model yielded a high  $R^2$  value (.923) indicating that the significant sustainability factors explained nearly 93 percent of the variation in overall rural population. The regression model yielded nineteen individual sustainability factors with statistically significant coefficients from the thirty-two factors loaded into the model. These nineteen sustainability factors are valid predictors of rural population change in Missouri and were incorporated into the assessment tool along with overall population change from 2000 to 2010. They include:

1. Change in the population group aged 18 to 29 years from 2000 to 2010.
2. Change in the population group aged 50 and over from 2000 to 2010.
3. Change in the number of persons employed in construction from 2000 to 2010.
4. Change in the number of public assistance income recipients from 2000 to 2010.
5. Change in the number of bachelor's or higher degree recipients from 2000 to 2010.
6. Change in the number of persons employed in entertainment, recreation and food service from 2000 to 2010.
7. Change in the number of retirement income recipients from 2000 to 2010.
8. Change in the number of Social Security income recipients from 2000 to 2010.
9. Change in the number of persons employed in professional services, scientific and management from 2000 to 2010.
10. Change in the number of high school graduates from 2000 to 2010.
11. Change in the number of persons employed in manufacturing from 2000 to 2010.

12. Change in the number of persons employed in finance, insurance and real estate from 2000 to 2010.
13. Change in the number of persons employed in wholesale trade from 2000 to 2010.
14. Change in the number of persons employed in information technologies from 2000 to 2010.
15. Change in population density (per square mile) from 2000 to 2010.
16. Natural Amenity Scale Rank (1=Low, 7=High).
17. Change in the number of rural immigrants from 2000 to 2010.
18. Change in the number of persons migrating into the town or village from 2006 to 2010.
19. Change in the number of persons employed in retail trade from 2000 to 2010.

A stepwise regression model was then applied to the above sustainability factors to establish a hierarchy of the significant factors for developing a weighting scheme for the predictive sustainability factors. Stepwise regression loads factors one at a time based on their ability to maximize the R<sup>2</sup> value for the model. Sustainability factors continue to be loaded into the model until the R<sup>2</sup> value can no longer be increased. Non-significant sustainability factors are excluded from the model. Weighting values were applied to each significant factor according to their contribution to the R<sup>2</sup> value for the model.

The review of past rural population studies and the subsequent statistical analysis has established a set of valid predictors of population change for rural Missouri towns and villages. It is those predictors that have been incorporated into the assessment tool and serve as the basis for generating the weighted factor scores and the overall weighted scores for rural Missouri communities.

**Accuracy of the Rural Population Sustainability Assessment Tool:** The assessment tool has been tested extensively for its accuracy in computing weighted sustainability factors from the original sustainability factor data. Data for rural Missouri towns is obtained from U.S. Census, Economic Research Service-USDA and Missouri sources and cross-checked and verified for accuracy. All computations used to convert the Census data to standardized scores has been verified as accurate and matched against standardized scores generated in SPSS Statistical Software. All weighting of factor computations is also verified as accurate by matching against the same computations generated in SPSS Statistical Software. Finally, computation of the weighted sustainability factor scores and the overall weighted scores has been verified as accurate through testing of approximately 75 randomly selected towns from the 745 rural towns in Missouri.

These steps have been taken to ensure the validity of the inputs into the assessment tool and the accuracy of the computations in the tool that generate the weighted factor scores and the overall weighted scores for each rural town and village in Missouri.

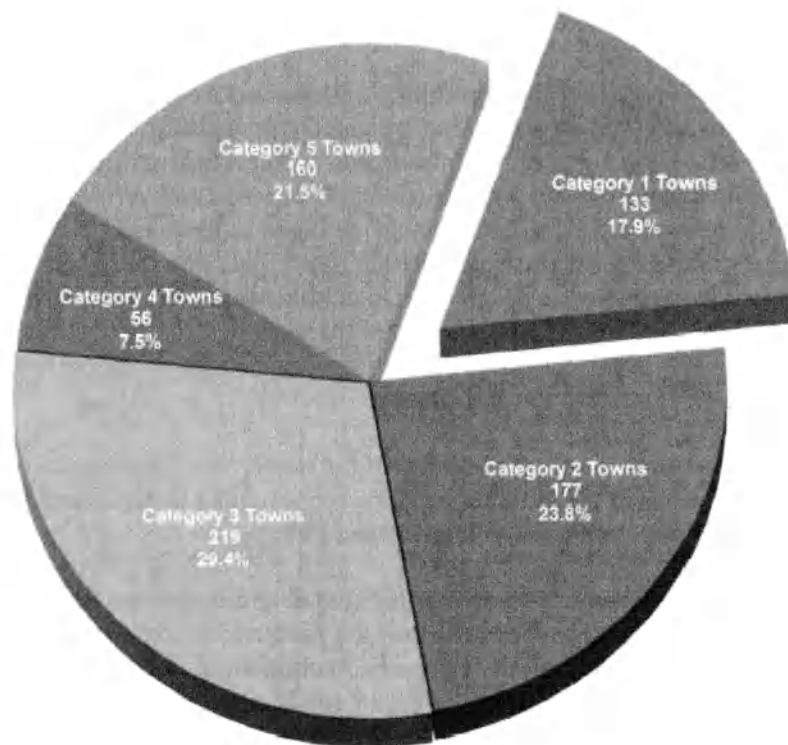
**Categories:** Category 1 and Category 2 communities are determined to be facing more challenging socioeconomic circumstances and over time as they are predicted to experience significant declines in both financial capability and population. Category 3 communities are projected to be relatively stable communities; however a swing in any of the 19 sustainability factors stated above would have an impact on the community's ability to sustain in the future. Category 4 and 5 communities have been determined to be thriving and are predicted to see a growth in economies and population over time.

### **Widespread Impact among the Potential Applicants**

EPA's guidance states that in order to determine widespread impact, one important factor to consider is the geographical area in which they occur. The Department collected demographic data for the 207 municipally owned facultative lagoons in Missouri as potential applicants and determined several ways to explain how and why a widespread impact would occur if the qualifying variance applicants are required to upgrade their lagoons systems to meet WQS of total ammonia nitrogen.

**Graph G-1: Missouri Rural Sustainability Chart with All Rural Communities.** A majority of the systems that will qualify for the MDV are located in the rural areas of Missouri. Therefore, one way to show a widespread impact is to use the MoSAT tool described in detail in Appendix F to look at the number of Category 1 and Category 2 town within all 745 rural towns of Missouri as they are likely to be unsustainable over time. As shown in Graph G-1, it was determined that 17.9 percent of the rural towns are considered to be Category 1 and 23.8 percent of rural towns are considered to be Category 2. Therefore, 41.6 percent of the rural communities in Missouri are considered to have an unsustainable population over time.

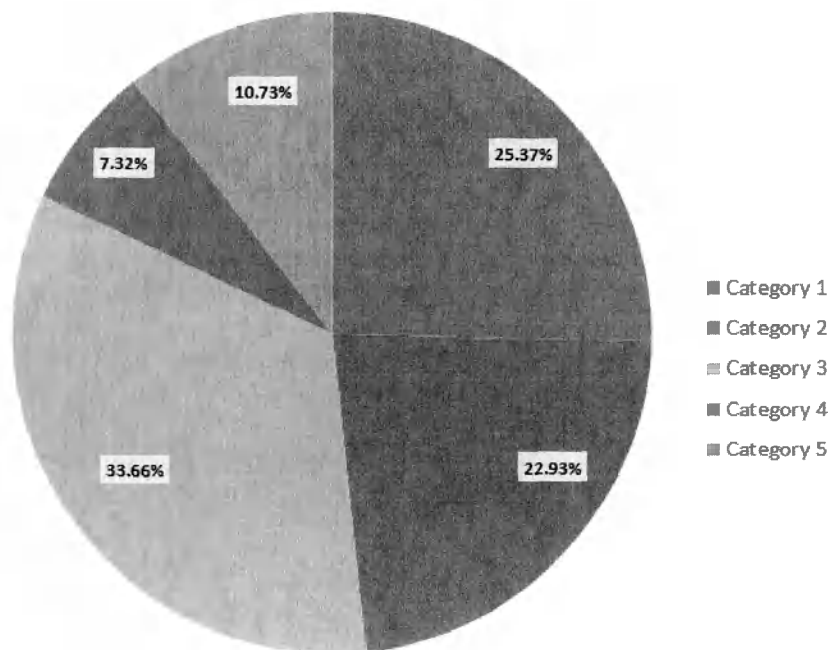
**Rural Missouri Towns  
Number & Percent by Population Sustainability Category  
N 745**





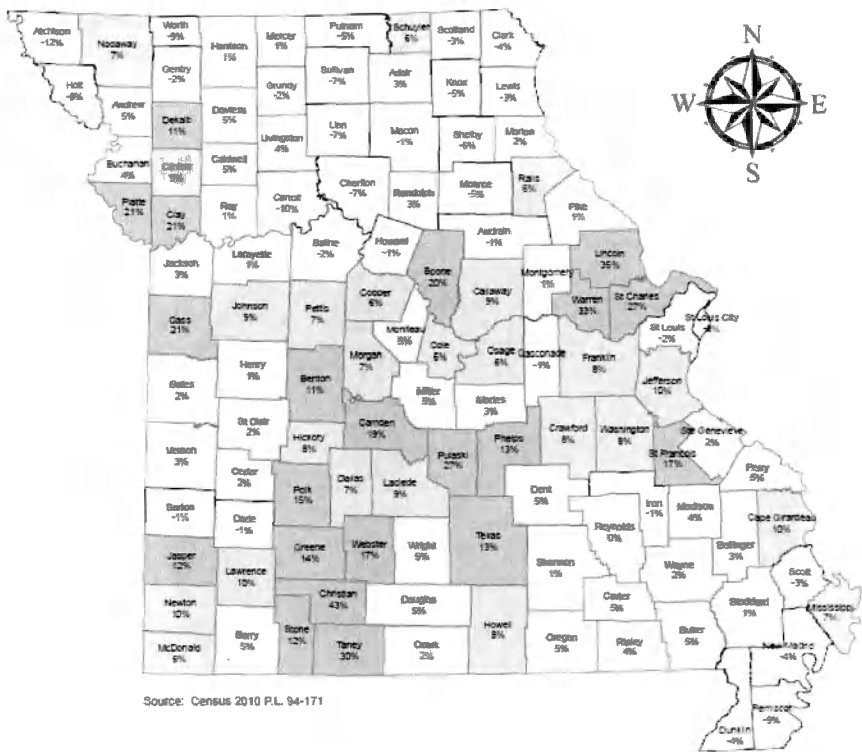
**Graph G-2: Missouri Rural Sustainability Chart with Potential Applicants Only, N=205.** A

majority of the systems that will qualify for the MDV are located in the rural areas of Missouri. Therefore, the MoSAT Tool was used to quantify the number potential applicants that scored within each of the 5 categories. The number of potential applicants to create the chart below is lower than the total number of potential applicants because the MoSAT Tool was developed specifically for rural communities. Two of the potential applicants did not qualify as rural community, though this would not disqualify them from the variance if they meet the criteria to prove 40 CFR 131.10(g)(6). As shown in Graph G-2, it was determined that 25.37 percent of the potential applicants scored as a Category 1 and 22.93 percent of the potential applicants scored as a Category 2. Therefore, 48.29 percent of all municipalities with a publicly owned facultative lagoon in Missouri are considered to have an unsustainable population over time. 33.66 percent of the potential applicants scored as a Category 3 municipality which means that though they are currently projected to be sustainable over time, any adverse change to one of the 19 sustainability factors used to calculate the over sustainability category could cause a detrimental effect to the sustainability of the community. 18.05 percent of the potential applicants scored as Category 4 or 5 communities. Though it is unlikely the communities that received a score of a Category 4 or 5 would qualify for the MDV at this time, significant changes to financial capability or sustainability could occur resulting in the need to apply for a variance.



**Figure G-1: Missouri County Population Change (2000 to 2010 Census).** This map shows the percent of population change of the Missouri counties based on the US Census data<sup>1, 2</sup>. It is clear from this map that the northern sections of the state as well as the southeastern section of the state are rural counties that experienced significant declines in population during the ten year time frame. The graph was developed by the planning and budget section of the office of administration and can be found <http://archive.oa.mo.gov/bp/pdf/PercentChange20002010.pdf>.

**Missouri  
County Population Change 2000 to 2010  
Percent Change**



**Legend**

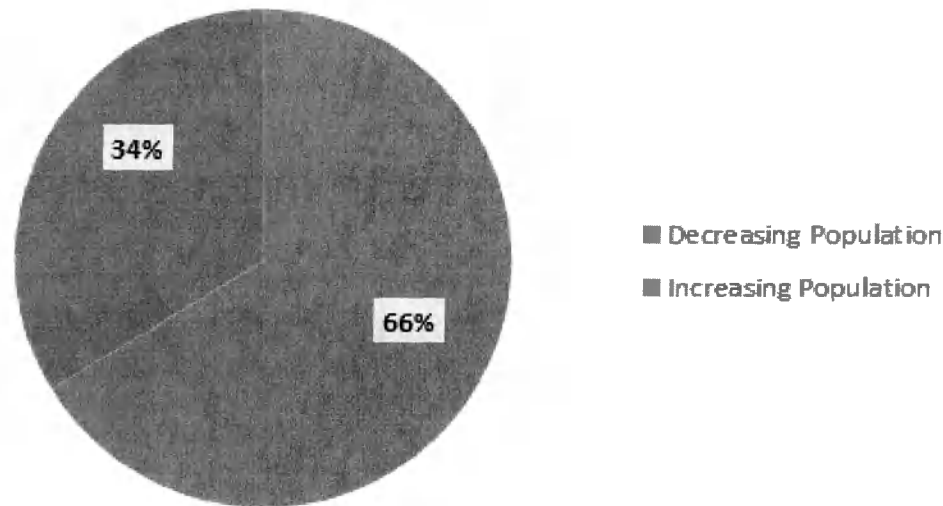
**% Change 2000 to 2010**

- 12% to -5%
- 4% to -1%
- 0% to 5%
- 6% to 10%
- 11% to 43%

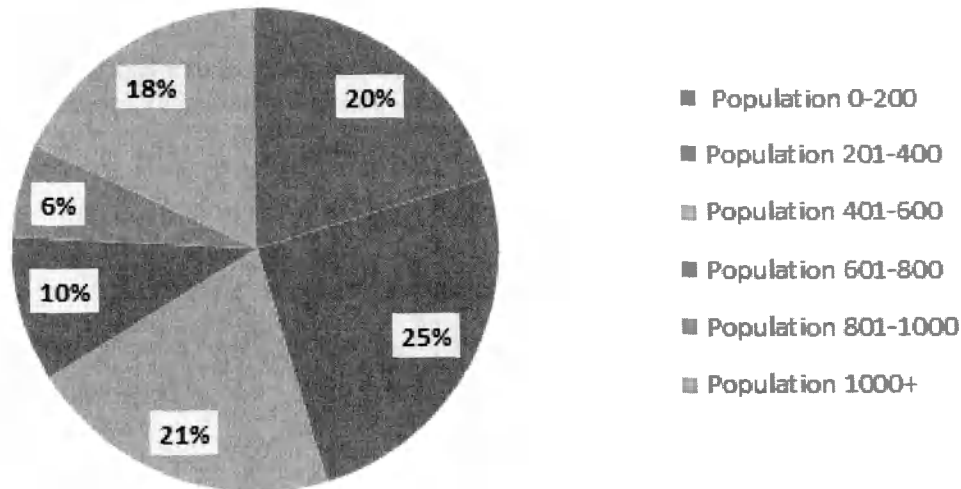
State Average = 7%

Prepared By Missouri Office of Administration  
Division of Budget and Planning 3/1/2011

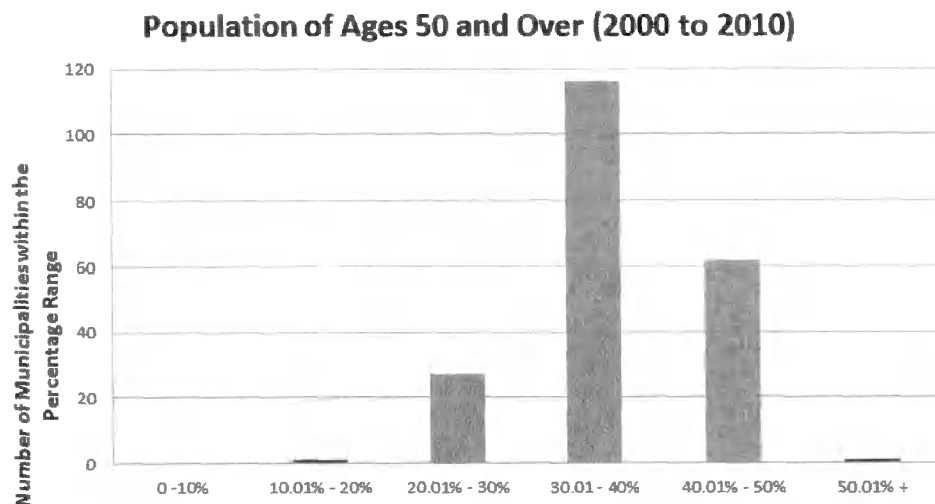
**Graph G-3: Change in Population (2000 to 2010).** The Department gathered the population trends of all potential applicants from 2000 to 2010 using the US Census data<sup>1, 2</sup>. It was determined that 66 percent of the municipalities that are publicly owned and utilize a facultative lagoon system for the treatment of wastewater have experienced a decrease in population from 2000 to 2010 (shown in blue), while only 34 percent of the municipalities that may be qualify for the variance have experienced a stable or increase in population (shown in red). Of the municipalities that have experienced a decrease in population; forty of the municipalities received a MoSAT score of a Category 3, 5 of the municipalities received a MoSAT score of a Category 4 and 1 received a MoSAT score of a Category 5; whereas, 50 of the municipalities received a MoSAT score of a Category 1 and forty-one received a MoSAT score of a Category 2. Therefore, it is it expected that ninety-one of Missouri's municipalities will continue to decrease in population over the next twenty years. Further, many of the same municipalities are the ones that are also experiencing other adverse socioeconomic conditions that significantly contribute to the future sustainability.



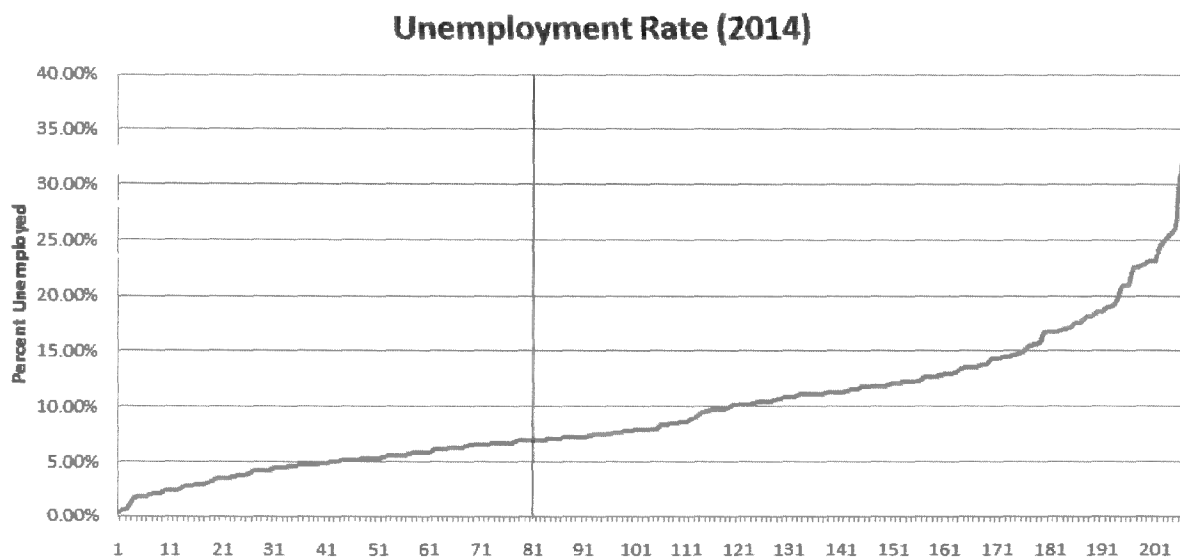
**Graph G-4: Total Population (2010).** The Department gathered the total population as reported on the 2010 U.S. Census<sup>2</sup> for all municipalities with a publicly owned facultative lagoon system within the State of Missouri. The percentages of potential applicants with a current population within the ranges listed in the legend are displayed on the pie chart. The results show that only 18 percent of the potential applicants have a population greater than 1000 people. Therefore, recipients of the MDV will be communities with a very small population and therefore the actual flow of discharge to receiving streams will also be minimal.



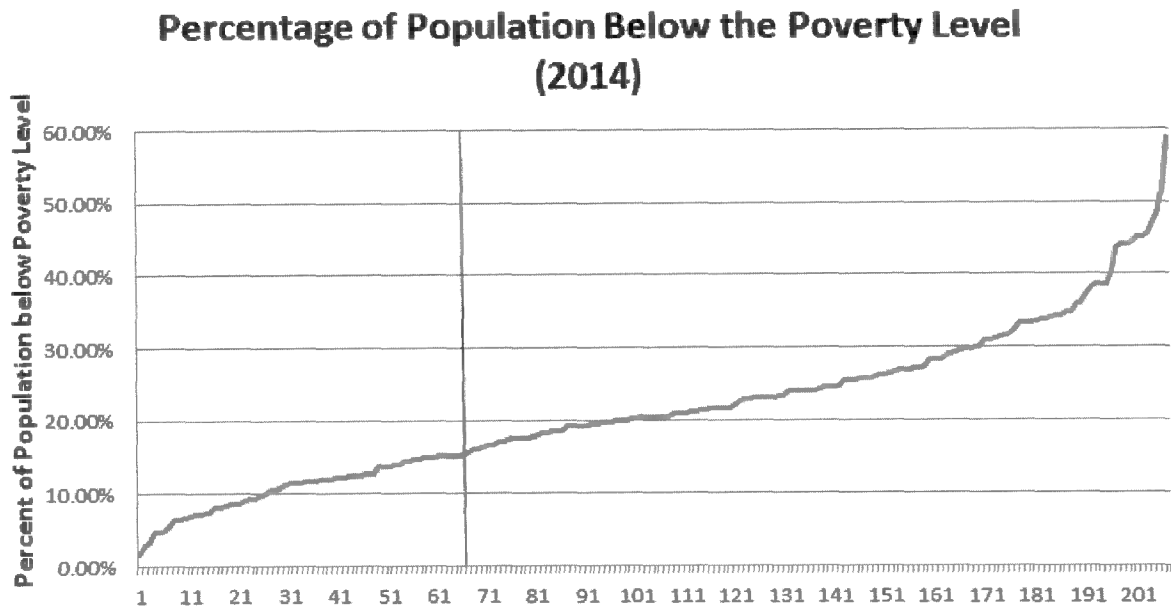
**Graph G-5: Percentage of Population Ages 50 and Over (2010).** The Department gathered population data from the 2010 U.S. Census<sup>3,4</sup> related to the amount of people within each potential applicant municipality that were documented as over the age of 50. It is shown below that 116 out of 207 potential applicants currently have a population base consisting of 30.01 to 40 percent over the age of 50 years and 62 out of 207 potential applicants currently have a population base consisting of 40.01 to 50 percent over the age of 50 years. This is important to consider when the community is deciding whether or not to take out a large loan that with an amortization term of twenty or thirty years, especially within the communities that are also experiencing other adverse socio-economic factors that contribute to difficulties with the municipality's overall sustainability.



**Graph G-6: Unemployment Rate (2014).** The unemployment data was collected for all Missouri’s municipalities that could be an applicant for the MDV from the 2010 to 2014 American Community Survey 5-Year Estimates<sup>5</sup>. It was determined that 49 percent of the potential applicants have an unemployment rate higher than that of the State’s unemployment rate of 8.1 percent. The horizontal axis represents each Missouri municipality that utilizes a publicly owned facultative lagoon as wastewater treatment. The vertical axis represents the percent of the population that was documented as unemployed. The vertical line within the graph represents the unemployment rate for the State of Missouri of 8.1 percent.

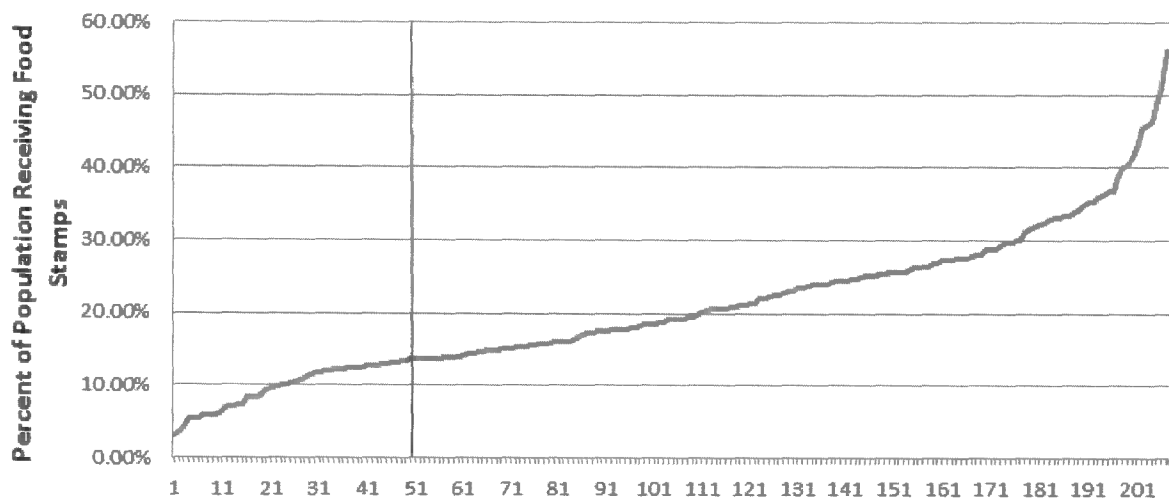


**Graph G-7: Percent of Population Living Below the Poverty Level (2014).** The percent of the population living below the poverty level was collected for all potential applicants from the 2010 to 2014 American Community Survey 5-Year Estimates<sup>6</sup>. It was determined that 68 percent of the potential applicants have a higher percentage of their population living below the poverty level as compared to the percentage living below the poverty level within the State of Missouri. The horizontal axis represents each Missouri municipality that utilizes a publicly owned facultative lagoon as wastewater treatment. The vertical axis represents the percent of the population documented living below the poverty level based on the 2014 American Community Survey 5-year estimates. The vertical line within the graph represents the percentage of the population living below the poverty level within the State of Missouri which is at 15.6 percent.



**Graph G-8: Percent of Households Receiving Food Stamps (2014).** The percent of households receiving food stamps was collected for all potential applicants from the 2010 to 2014 American Community Survey 5-Year Estimates<sup>6</sup>. It was determined that 76 percent of the potential applicants have a higher percentage of their population receiving government assistance and collecting food stamps to pay for daily necessities as compared to the percentage receiving food stamps over the State of Missouri. The horizontal axis represents each Missouri municipality that utilizes a publicly owned facultative lagoon as wastewater treatment. The vertical axis represents the percent of the population documented they received food stamps based on the 2014 American Community Survey 5-year estimates. The vertical line in the graph represents the percentage of the population receiving food stamps within the State of Missouri which is at 13.5 percent.

**Percentage of Households Receiving Food Stamps  
(2014)**



**Preliminary Calculation of the Estimated Cost to Upgrade for Each Potential Applicant:**

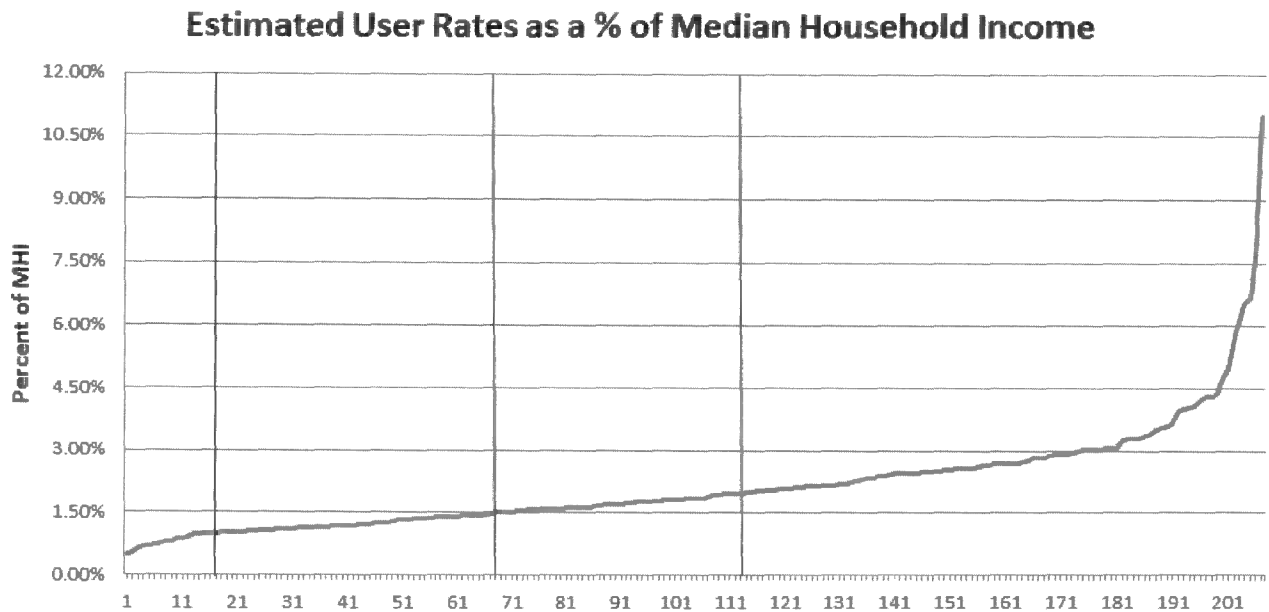
Another example of widespread impact over the pool of potential applicants is to show that a majority of the potential applicants will struggle financially if required to upgrade. Using CAPDET, the Department ran the model and estimated the cost of a mechanical plant and the cost of a wastewater irrigation plant for each individual municipality that utilizes a publicly owned facultative lagoon as the treatment for wastewater. The Department then determined the potential user rate as a percentage of the MHI<sup>7</sup> for each potential applicant for both the mechanical treatment option and the wastewater irrigation option. The potential user rate was based on the design flow and the number of connections that is associated with the design flow as opposed to the CAFCom received with a permit renewal, which is more detailed as the Department runs the analysis on the permitted design flow and number of active connections for each facility. Graphs G-9 and G-10 below show the potential user rate as a percentage of median household income for each potential applicant with the estimated costs for the mechanical treatment option, and the estimated costs of the wastewater irrigation option. It should be noted, the Department does not consider the cost for a wastewater irrigation system for design flows over 150,000 gallons per day as it has been shown to be a more expensive option for communities that would be required to purchase a substantial amount of land for the application of wastewater. Therefore, there are less potential applicants shown in Graph G-10. It should also be noted that the costs for the wastewater irrigation system include the average cost of land for their county and assume that the current lagoon can be used as a storage basin. The mechanical treatment option costs are for a package plant for facilities with a design flow of less than 60,000 gpd and for an oxidation ditch for facilities with a design flow greater than 60,000 gpd. Both treatment options were designed to meet a total ammonia nitrogen monthly average concentration of 0.6 mg/L and a daily maximum concentration of 1.7 mg/L.

EPA's Economic Guidance for Water Quality Standards utilizes a "substantial impacts matrix" which determines that a potential user rate greater than or equal to 1 percent of the community's MHI with a secondary score of greater than 2.5 will need additional information to determine the substantial and widespread social and economic impacts. The Department guidance on how to determine the financial burden of a community also utilizes a matrix to determine if the financial burden will be categorized as "low, medium or high." The matrix shows that if the potential user rate is over 1 percent of the community's MHI, combined with a weak financial capability, it is categorized as a "high" financial burden for the community. Graphs G-9 and G-10 below show the percentage of potential applicants that would result in user rates greater than or equal to 1 percent, 1.5 percent, and 2 percent of their respective MHI.

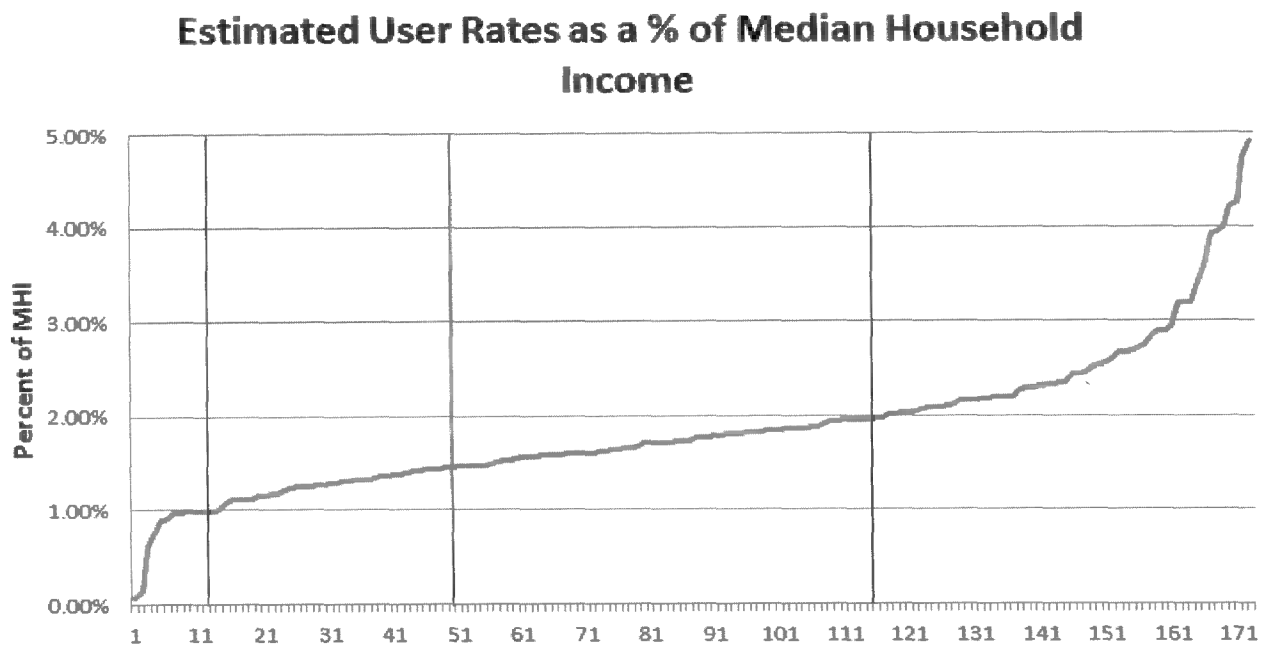


**Graph G-9: Potential User Rate as a Percentage of Median Household Income for**

**Mechanical Plant.** The numbers on the x-axis represent each of the 207 Missouri municipalities that currently utilize a publicly owned facultative lagoon to treat wastewater. The y-axis shows the estimated user rate as a percentage of the corresponding municipality's current median household income. The median household income is based on the American Community Survey's 5-year estimates<sup>7</sup>. Based on the preliminary cost estimates for each potential applicant as detailed above; it is shown below that if required to upgrade to a mechanical plant to meet the WQBEL for total ammonia nitrogen then 93 percent of potential applicants are likely to result in user rates greater than 1 percent of their MHI, 68 percent of potential applicants are likely result in user rates greater than 1.5 percent of their MHI, and 45 percent of potential applicants are likely to result in user rates greater than 2 percent of their MHI. The vertical lines within the graph indicate where the 1 percent, 1.5 percent, and 2 percent points intersect the x-axis.



**Graph G-10: Potential User Rate as a Percentage of Median Household Income for Wastewater Irrigation System.** The numbers on the x-axis represent each potential applicants with a design flow less than or equal to 150,000 gpd (173 potential applicants). The y-axis shows the estimated user rate for a wastewater irrigation system as a percentage of the corresponding municipality's median household income. The median household incomes are based on the American Community Survey's 5-year estimates<sup>7</sup>. Based on the preliminary cost estimates for each potential applicant as detailed above; it is shown below that if required to upgrade to a wastewater irrigation system which would remove discharge effluent limits for total ammonia nitrogen from the permit, 94 percent of potential applicants are likely to result in user rates greater than 1 percent of their MHI, 68 percent of potential applicants are likely to result in user rates greater than 1.5 percent of their MHI, and 32 percent of potential applicants are likely to result in user rates greater than 2 percent of their MHI. The vertical lines in the graph indicate where the 1 percent, 1.5 percent, and 2 percent points intersect the x-axis.



Appendix H– 40 CFR § 131.14 and Missouri Multiple Discharger Variance Framework: Total Ammonia Nitrogen Crosswalk Table

40 CFR 131.14	Missouri MDV – Total Ammonia Nitrogen
<p>131.14 WQS Variances.</p> <p>States may adopt WQS variances, as defined in § 131.3(o). Such a WQS variance is subject to the provisions of this section and public participation requirements at §131.20(b). A WQS variance is a water quality standard subject to EPA review and approval or disapproval.</p>	<p>644.061, RSMo.</p> <p>1. Unless prohibited by any federal water pollution control act, or if an application does not require a permit pursuant to any federal water pollution control act, the commission may grant individual variances beyond the limitations prescribed in sections 644.006 to 644.141 whenever it is found, upon presentation of adequate proof, that compliance with any provisions of sections 644.006 to 644.141 or rule or regulation, standard, requirement, limitation, or order of the commission or director adopted pursuant thereto will result in an arbitrary and unreasonable taking of property or in the practical closing and elimination of any lawful business, occupation or activity, in either case, without sufficient corresponding benefit or advantage to the people; but no variance shall be granted where the effect of a variance will permit the continuance of a condition which may unreasonably cause or contribute to adverse health effects upon humans or upon fish or other aquatic life or upon game or other wildlife, and any variance so granted shall not be so construed as to relieve the person who receives the variance from any liability imposed by other law for the commission or maintenance of a nuisance.</p>
<b>(a) Applicability.</b>	
<p>(1) A WQS variance may be adopted for a permittee(s) or water body/waterbody segment(s), but only applies to the permittee(s) or water body/waterbody segment(s) specified in the WQS variance.</p>	<p>The MDV only applies to minor, municipals with a well-functioning, multi-celled, facultative lagoon system that if required to upgrade their current facility, the residents of the community would experience a substantial and widespread social and economic impact per 40 CFR § 131.10(g)(6).</p>
<p>(2) Where a State adopts a WQS variance, the State must retain, in its standards, the underlying designated use and criterion addressed by the WQS variance, unless the State adopts and EPA approves a revision to the underlying designated use and criterion consistent with § 131.10 and §131.11. All other applicable standards not specifically addressed by the WQS variance remain applicable.</p>	<p>The receiving waterbody of each recipient of the variance will retain its underlying designated use of Protection of Aquatic Life (AQL) and ammonia criteria for purposes other than permit limits. All other WQS not specifically addressed by the variance continue to apply in those waters for all Clean Water Act purposes. The WQS for total ammonia nitrogen for all other permit holders will remain as stated in state regulation at 10 CSR 20-7.031 (5)(B)7 and Table B of the WQS.</p>
<p>(3) A WQS variance, once adopted by the State and approved by EPA, shall be the applicable standard for purposes of the Act under § 131.21(d) through (e), for the following limited purposes. An approved</p>	<p>This MDV Framework is adopted by reference within 10 CSR 20-7.031. The amendment to the rule allows permits to be issued under the terms and conditions of this variance framework. The amendment to 10 CSR 20-7.031 has been provided</p>

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<p>WQS variance applies for the purposes of developing NPDES permit limits and requirements under 301(b)(1)(C), where appropriate, consistent with paragraph (a)(1) of this section. States and other certifying entities may also use an approved WQS variance when issuing certifications under section 401 of the Act.</p>	<p>to the Clean Water Commission for their decision and forwarded to the Missouri Attorney General for certification. Following adoption by the Missouri Clean Water Commission and publication in the Missouri Register, the effective WQS rule was submitted to EPA Region 7 for approval. Approval of the MDV framework and reference in 10 CSR 20-7.031 by EPA will allow the Department to use the MDV for Clean Water Act purposes.</p>
<p>(4) A State may not adopt WQS variances if the designated use and criterion addressed by the WQS variance can be achieved by implementing technology-based effluent limits required under sections 301(b) and 306 of the Act.</p>	<p>Each applicant is required to have an engineering evaluation completed by the Department to determine if their lagoon is well-functioning. The lagoon must meet the definition of a well-functioning system to qualify for the MDV as shown in Appendix A. The permit issued to the MDV recipient will contain effluent limits for BOD<sub>5</sub>, TSS, and pH as required pursuant to 10 CSR 20-7.015. However, meeting the technology based effluent limits for BOD<sub>5</sub>, TSS and pH may not provide sufficient treatment necessary to reduce the amount of total ammonia nitrogen in the effluent to meet WQS. In no case, shall permit limitations based on the MDV be less restrictive than the technology based effluent limits pursuant to 10 CSR 20-7.015.</p> <p>The WQS for total ammonia nitrogen are not attainable through nonpoint source control or best management practices.</p>
<p><b>(b) Requirements for Submission to EPA.</b></p>	
<p><b>(1) A WQS variance must include:</b></p>	
<p>(i) Identification of the pollutant(s) or water quality parameter(s), and the water body/waterbody segment(s) to which the WQS variance applies. Discharger(s)-specific WQS variances must also identify the permittee(s) subject to the WQS variance.</p>	<p>This is a request to vary the water quality standard (WQS) for total ammonia nitrogen for the protection of the aquatic life support designated use. The application process ensures that all applicants are minor municipal, Publicly Owned Treatment Works (POTW), well-functioning, multi-celled, facultative lagoon systems where the residents of the community would experience a substantial and widespread social and economic impact if required to upgrade their current lagoon system to meet the WQS of total ammonia nitrogen. The complete and detailed application process is located in Appendix C.</p>
<p>(ii) The requirements that apply throughout the term of the WQS variance. The requirements shall represent the highest attainable</p>	<p>(3) No additional feasible pollutant control technology can be identified for the qualifying applicants. The technologies that the Department estimates the cost for within the CAFCom are: a no</p>

<p>condition of the water body or waterbody segment applicable throughout the term of the WQS variance based on the documentation required in (b)(2) of this section. The requirements shall not result in any lowering of the currently attained ambient water quality, unless a WQS variance is necessary for restoration activities, consistent with paragraph (b)(2)(i)(A)(2) of this section. The <u>State</u> must specify the highest attainable condition of the water body or waterbody segment as a quantifiable expression that is one of the following:</p> <p>(A) For Discharger(s)-specific WQS variances:</p> <p>(1) The highest attainable interim criterion; or</p> <p>(2) The interim effluent condition that reflects the greatest pollutant reduction achievable; or</p> <p>(3) If no additional feasible pollutant control technology can be identified, the interim criterion or interim effluent condition that reflects the greatest pollutant reduction achievable with the pollutant control technologies installed at the time the State adopts the WQS variance, and the adoption and implementation of a Pollutant Minimization Program.</p>	<p>discharge land applications system, an extended aeration oxidation ditch, sequencing batch reactor, extended aeration with triangular basin and an extended aeration package plant. Each applicant is also required to submit an alternatives analysis which analyzes the estimated costs of decentralization of the wastewater utility, relocation of the outfall, and regionalization of the utility. All estimated costs must be determined to cause a substantial economic impact based on the results from the Department’s Financial Capability Matrix and the EPA’s Substantial Impacts Matrix. The MDV Framework specifies the permit holder that receives an issued permit written with the terms and conditions of the MDV Framework must meet all requirements of the Pollution Minimization Program (PMP). The PMP is written into the MDV Framework and begins on page 7. Appendix A further details the PMP that each approved permittee shall follow and the reporting criteria that are required as part of the PMP.</p>
<p>(iii) A statement providing that the requirements of the WQS variance are either the highest attainable condition identified at the time of the adoption of the WQS variance, or the highest attainable condition later identified during any reevaluation consistent with paragraph (b)(1)(v) of this section, whichever is more stringent.</p>	<p>The highest attainable effluent conditions (HAC) are the highest that each individual applicant can meet at this time. The HAC will be implemented through the permit as final effluent limits with no schedule of compliance to achieve the limits. The Department has determined two scenarios to establish the highest attainable effluent condition.</p> <p>(1) The Department will determine the site specific seasonal highest attainable effluent conditions for each individual applicant by using their past five years of reported data for total ammonia nitrogen. The 95<sup>th</sup> and 99<sup>th</sup> percentiles from the reported concentrations will be determined for each individual applicant. The 95<sup>th</sup> percentile is to be the final effluent limit in the form of the monthly average and the 99<sup>th</sup> percentile is to be the final effluent limit in the form</p>

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	<p>of the daily maximum.</p> <p>(2) If the applicant's well-functioning facility is meeting the total ammonia nitrogen criteria during one season but not the other, the current criteria for total ammonia nitrogen will remain as the water quality based effluent limit during the season in which the facility can treat to the criteria level. The season, in which the facility cannot meet the current criteria, the permit will be issued with the highest attainable effluent limits as the monthly average and the daily maximum based on the 95<sup>th</sup> and 99<sup>th</sup> percentile of the facility's current performance.</p> <p>The HAC will be reevaluated by recalculating the HAC using the most up to date discharge monitoring reports every five years. This practice ensures that the most stringent HAC is the final effluent limit that will be issued with the permit.</p>
<p>(iv) The term of the WQS variance, expressed as an interval of time from the date of EPA approval or a specific date. The term of the WQS variance must only be as long as necessary to achieve the highest attainable condition and consistent with the demonstration provided in paragraph (b)(2) of this section. The State may adopt a subsequent WQS variance consistent with this section.</p>	<p>The Department finds a 20-year variance is the appropriate time necessary to ensure each permittee that is in need of the variance from the WQS of total ammonia nitrogen received adequate technical, managerial, and financial training, guidance, and assistance to support the municipality's future growth and sustainability. The total time of the MDV is for 20-years once it is approved by EPA. The MDV will be implemented during the permit renewal process. Therefore, not every permit issued under the MDV will receive the variance for a total time of 20 years. Because the Department permit renewal occurs once every five years on a rolling cycle, all potential applicants should be analyzed for applicability for the variance within the first five years of the MDV. Therefore, each recipient would receive a minimum of three permit cycles to optimize treatment as required by the PMP. The first permit cycle, Department staff will provide the permit holder with one-on-one technical, managerial, and financial training and guidance to implement the designed plan. Department staff will provide each municipality covered under this variance with an individualized assessment over several meetings with municipal staff to discuss the needs of the community. The Department is committed to provide the municipality with the information and tools to improve operations at the facility and make informed, common sense decisions on wastewater</p>

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	<p>infrastructure upgrades. The permit holder would then have two remaining permit cycles to work on the goals provided by the community services coordinators individualized assessment.</p> <p>Further, a 20 year term would allow for two census cycles to occur, which will likely demonstrate the downward population trend. The twenty year time period also allows for the development of new technologies that could allow for the compliance with current water quality standards. If at any time during the re-evaluation periods a new technology will allow a community to affordably comply with water quality standards, the permit will be issued with a compliance schedule to meet water quality standards of total ammonia nitrogen.</p>
<p>(v) For a WQS variance with a term greater than five years, a specified frequency to reevaluate the highest attainable condition using all existing and readily available information and a provision specifying how the State intends to obtain public input on the reevaluation. Such reevaluations must occur no less frequently than every five years after EPA approval of the WQS variance and the results of such reevaluation must be submitted to EPA within 30 days of completion of the reevaluation.</p>	<p>This request for the MDV exceeds five years in length. The MDV framework will be reevaluated every five years after the MDV becomes effective. The MDV will no longer be applicable if a reevaluation of the MDV framework is not conducted five years from the effective date of the MDV framework which will coincide with the approval of an amendment to 10 CSR 20-7.031. The reevaluation of the MDV framework will be sent to EPA within 30 days of the reevaluation. If the Department fails to provide EPA with the results from the reevaluation within 30 days, the MDV shall be null and void until such time the state completes and submits the reevaluation to EPA.</p> <p>A re-evaluation of the permit holder's financial capability will occur during the 5 year permit renewal process. The financial conditions of the municipality will be re-evaluated during the 5 year renewal process to determine the substantial and widespread social and economic impacts placed on the community would persist if required to upgrade at that time. Public input for the continuation of the variance will be addressed during the 30-day public notice period of the permit per 10 CSR 20-6.020. After public notice, EPA will be notified that a re-evaluation of the MDV has been completed within 30 days of the end date of the public notice. If, during the re-evaluation of the necessity for the variance during the permit renewal process, new technologies are identified and determined to be technologically applicable and economically feasible for specific communities, the Department will evaluate and consider corresponding options associated with the need for the variance. Also, a</p>

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	community that qualifies for the variance prior to receiving grant funding will have their variance applicability re-evaluated upon the receipt of grant funding. If the receipt of grant funding changes the indication of widespread and substantial social and economic impacts for any alternative, variance applicability would be in question.
(vi) A provision that the WQS variance will no longer be the applicable water quality standard for purposes of <u>the Act</u> if the <u>State</u> does not conduct a reevaluation consistent with the frequency specified in the WQS variance or the results are not submitted to EPA as required by (b)(1)(v) of this section.	As stated above, the reevaluation of the MDV framework will be sent to EPA within 30 days of the reevaluation. If the Department fails to provide EPA with the results from the reevaluation within 30 days, the MDV shall be null and void until such time the state completes and submits the reevaluation to EPA.
<b>(2) The supporting documentation must include:</b>	
(i) Documentation demonstrating the need for a WQS variance. (A) For a WQS variance to a use specified in section 101(a)(2) of <u>the Act</u> or a sub-category of such a use, the <u>State</u> must demonstrate that attaining the designated use and criterion is not feasible throughout the term of the WQS variance because: (1) One of the factors listed in § 131.10(g) is met, or (2) Actions necessary to facilitate lake, wetland, or stream restoration through dam removal or other significant reconfiguration activities preclude attainment of the designated use and criterion while the actions are being implemented.	40 CFR § 131.10(g)(6) – Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread social and economic impacts. The basis for this request is 40 CFR § 131.10(g)(6), meaning that each applicant will submit justification that compliance with the water quality based effluent limit (WQBEL) of total ammonia nitrogen would result in substantial and widespread social and economic impacts among the residents of the community. Like conducting an individual variance request, the substantial impact analysis conducted will use site specific information for each potential applicant and be completed at the time of their regularly scheduled permit renewal process. The Department has determined a three step process for each community to justify substantial impacts will occur as a result of compliance with WQS. The three analyses include: the Department’s CAFCom, the alternatives analysis, and the WESI. All analyses are thoroughly explained within the MDV. The EPA considers substantial impacts to also be widespread if they will have significant adverse impacts on the local community. The Department has considered a variety of social demographics that have an effect on the community’s ability to repay a significant loan associated with the total present worth of a treatment system designed to meet WQS of total ammonia nitrogen. The widespread impact report is detailed in Appendix G.



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<p>(ii) Documentation demonstrating that the term of the WQS variance is only as long as necessary to achieve the highest attainable condition. Such documentation must justify the term of the WQS variance by describing the pollutant control activities to achieve the highest attainable condition, including those activities identified through a Pollutant Minimization Program, which serve as milestones for the WQS variance.</p>	<p>No additional feasible pollutant control technology can be identified, the HAC is the final effluent limit within the NPDES permit. Each MDV recipient is obligated to meet the requirements of the PMP. The goal of the PMP is to maintain effluent concentrations of total ammonia nitrogen.</p>
<p>(iii) In addition to paragraphs (b)(2)(i) and (ii) of this section, for a WQS variance that applies to a water body or waterbody segment: (A) Identification and documentation of any cost-effective and reasonable best management practices for nonpoint source controls related to the pollutant(s) or water quality parameter(s) and water body or waterbody segment(s) specified in the WQS variance that could be implemented to make progress towards attaining the underlying designated use and criterion. A State must provide public notice and comment for any such documentation. (B) Any subsequent WQS variance for a water body or waterbody segment must include documentation of whether and to what extent best management practices for nonpoint source controls were implemented to address the pollutant(s) or water quality parameter(s) subject to the WQS variance and the water quality progress achieved.</p>	<p>This provision does not apply.</p>
<p>(C) Implementing WQS variances in NPDES permits. A WQS variance serves as the applicable water quality standard for implementing NPDES permitting requirements pursuant to § 122.44(d) of this chapter for the term of the WQS variance. Any limitations and requirements necessary to implement the WQS variance shall be included as enforceable conditions of the NPDES permit for the permittee(s) subject to the WQS variance.</p>	<p>This variance will be used solely to establish effluent limits for total ammonia nitrogen within permits. The variance will not be used for any other Clean Water Act or Missouri Clean Water Law Purposes.</p>

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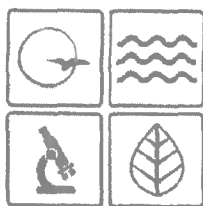
40 CFR 131.20(a)	Missouri MDV – Total Ammonia Nitrogen
<p>The State shall from time to time, but at least once every 3 years, hold public hearings for the purpose of reviewing applicable water quality standards adopted pursuant to §§ 131.10 through 131.15 and Federally promulgated water quality standards and, as appropriate, modifying and adopting standards. The State shall also re-examine any waterbody segment with water quality standards that do not include the uses specified in section 101(a)(2) of the Act every 3 years to determine if any new information has become available. If such new information indicates that the uses specified in section 101(a)(2) of the Act are attainable, the State shall revise its standards accordingly. Procedures States establish for identifying and reviewing water bodies for review should be incorporated into their Continuing Planning Process. In addition, if a State does not adopt new or revised criteria for parameters for which EPA has published new or updated CWA section 304(a) criteria recommendations, then the State shall provide an explanation when it submits the results of its triennial review to the Regional Administrator consistent with CWA section 303(c)(1) and the requirements of paragraph (c) of this section.</p>	<p>The Department will incorporate the highest attainable effluent condition, of which the WQS is being varied, into a table within 10 CSR 20-7.031 during each triennial review. The table within the WQS will contain at a minimum the municipality (owner), facility name, permit number, receiving stream name, HAC, first classified waterbody ID, discharge location, effective permit date, and the variance expiration date.</p>

## References

1. U.S. Census Bureau (2012) 2010 Census of Population and Housing, Summary Population and Housing Characteristics, CPH-I-27, Missouri. Table 2. Age and Sex: 2010. Washington, DC. Pages 80-114. <http://www.census.gov/prod/cen2010/cph-1-27.pdf>.
2. U.S. Census Bureau. 2010-2014 American Community Survey 5-Year Estimates, Table B01003: Total Population - Universe: Total Population. [http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_14\\_5YR\\_B01003&prodType=table](http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_14_5YR_B01003&prodType=table).
3. For United States, U.S. Census Bureau (2002) 2000 Census of Population and Housing, Summary Social, Economic, and Housing Characteristics, PHC-1-1 Part 1. United States Summary, Table 1. Age and Sex: 2000, Washington, DC., Page 2. <https://www.census.gov/prod/cen2000/phc-1-1-pt1.pdf>.
4. For Missouri State, U.S. Census Bureau (2002) 2000 Census of Population and Housing, Summary Population and Housing Characteristics, PHC-1-27, Missouri, Table 2. Age and Sex: 2000, Washington, DC., Pages 64-92. <http://www.census.gov/prod/cen2000/phc-2-27-pt1.pdf>.
5. U.S. Census Bureau. 2010-2014 American Community Survey 5-Year Estimates, B23025: Employment Status for the Population 16 Years and Over - Universe: Population 16 years and Over. [http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_14\\_5YR\\_B23025&prodType=table](http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_14_5YR_B23025&prodType=table).
6. U.S. Census Bureau. 2010-2014 American Community Survey 5-Year Estimates, Table S1701: Poverty Status in the Past 12 Months. [http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_14\\_5YR\\_S1701&prodType=table](http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_14_5YR_S1701&prodType=table).
7. U.S. Census Bureau. 2010-2014 American Community Survey 5-Year Estimates, Table B19013: Median Household Income in the Past 12 Months (in 2014 Inflation-Adjusted Dollars). [http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_14\\_5YR\\_B19013&prodType=table](http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_14_5YR_B19013&prodType=table).



# ATTACHMENT 3 (EPA's 12/26/2019 WQS Action)



Missouri Department of dnr.mo.gov

**NATURAL RESOURCES**

Michael L. Parson, Governor

Carol S. Comer, Director

AUG 16 2019

RECEIVED  
AUG 23 2019

BY: .....

Mr. Jeffery Robichaud, Director  
Water Division  
U.S. Environmental Protection Agency, Region 7  
11201 Renner Boulevard  
Lenexa, KS 66219

Dear Mr. Robichaud,

Thank you for your letter dated May 16, 2019, in which you commented on the Multiple Discharger Variance (MDV) for Ammonia Framework. Your letter outlines three issues and provides paths to resolve those issues as discussed in our May 7, 2019, meeting in Jefferson City.

1. **Addressing cases where the Widespread Economic and Social Impact (WESI) secondary indicator determines the impact is “unclear.”** The Missouri Department of Natural Resources will not determine MDV eligibility solely on “unclear” WESI results. A Cost Analysis for Compliance (CAFCOM) will be conducted for every municipality as a part of the MDV application process. The CAFCOM estimates the potential financial burden for publicly-owned treatment works to comply with new requirements in the permit by use of tools to determine affordability such as Missouri’s Rural Missouri Sustainability Assessment Tool, which is a tool that forecasts rural Missouri community populations and future sustainability. The CAFCOM will provide additional economic justification supporting the determination that the impact is, “likely to be substantial” prior to granting the variance. The Department will clarify this section of the MDV Framework in the next rulemaking.
2. **Identify water body segments to which the variance may apply.** The Department provided a list of water bodies where the MDV may apply for public notice from July 1 through August 9, 2019. The public notice announcement was sent through our email list utilized for water quality standards and public notice announcements. The list of water bodies was posted on the Department’s website during the public notice period. One comment letter was received via email from the Missouri Department of Conservation. See the enclosure for their comment and our response.
3. **Pollutant Minimization Program relationship between well-functioning lagoon and sludge depth.** Along with the MDV Framework requirement for an eligible municipality’s lagoon to have no more than a 25 percent loss of its design detention time, the Department



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will establish a permit condition to the same effect after granting of the variance. In order to maintain coverage under the MDV, a municipality must measure and report lagoon sludge depth at each permit renewal. If it appears that a rising sludge depth will increase the detention time loss over 25 percent, the Department will establish a permit schedule for sludge to be removed from the lagoon as soon as possible. The Department will clarify this in the MDV Framework in the next rulemaking.

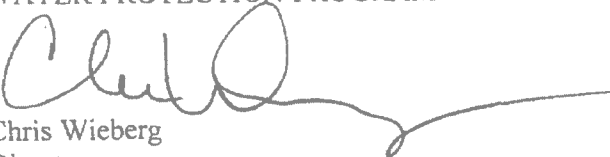
We appreciate your comments and hope this letter adequately responds to your concerns and will lead to an approval of the MDV Framework.

In regard to another item undergoing agency review, the Department appreciated the opportunity to provide additional information and clarification regarding new national recommended Section 304(a) criteria for aquatic life protection promulgated into Tables A-1 and A-2 of the Water Quality Standards. In addition to the August 7, 2019, email sent to Ms. Amy Shields, the Department is enclosing hardcopies of that correspondence and the bold/italics version of the tables that were available during public notice.

If you have any questions concerning these matters, please contact Ms. Angela Falls, of my staff, by phone at 573-751-1419, by e-mail at [angela.falls@dnr.mo.gov](mailto:angela.falls@dnr.mo.gov), or by mail at Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, MO 65102. Thank you.

Sincerely,

WATER PROTECTION PROGRAM

A handwritten signature in black ink, appearing to read 'Chris Wieberg', with a long horizontal flourish extending to the right.

Chris Wieberg  
Director

CW:afh

Enclosure